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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

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Laurence V. Burton, Editor

On With the Farm Holiday!

POLITICAL speakers are now focusing attention on the long-standing plight of agriculture. As long as the rural voter holds the balance of power, his troubles will receive such gratuitous attention. Yet few have the courage to point out that there is far too much production by agriculture and that much of the unemployment in *urban* industry is the result of agricultural overproduction.

● SINCE THE WAR, nearly every nation has been consciously furthering the development of its own agriculture. Brazil stimulated overdevelopment of coffee growing. The Stevenson plan, of English origin, brought about too great a production of rubber. Germany stimulated dairying to cut off imports of dairy products from Denmark. The Danes went in for hog raising and now dominate what was once our own export market for pork. And so it has gone. The list is too long to recount in full.

● AS A RESULT of this stimulation of agriculture, much of our export market for farm products is gone—probably forever. Furthermore, farm lands in our own county have not only been increased in area but have been increased also in productivity per acre by scientific methods. Huge areas have been released which formerly were needed for feeding the horse.

● THE TIME has come to recognize that continued production of more food than the population can eat is nearly as great an economic disaster as producing too little. Unfortunately, however, it has become a tradition that the farmer should be encouraged to believe that he has a *right* to a profit on all his products, regardless of volume. We wish it were true. *Any business man wishes he had such a right to a profit.*

● BUT HOW FEW are the effective political voices that will tell agriculture the unpleasant truth that *nobody* has any such right, that production must practically balance the demand to make a profit possible to the majority, regardless of the field of endeavor! Unfortunately, those men who can look impartially and scientifically at a problem of this magnitude seldom posses the necessary force and persuasive ability to produce a measurable effect. Unhappily, a second-rate politician can talk down a first-rate agricultural economist before a crowd, because farmers are men, and men love to be kidded into doing what they want to do.

● AGRICULTURE needs better leadership than it gets. It is most disheartening that for every sane admonition against agricultural overproduction there are a dozen politicians shedding crocodile tears over the plight of their constituents, vowing that as long as they continue to be the farmers' spokesman and leader, no predatory autocracy can deprive them of their homes and livelihoods. Yet until urban population and industry are compelled by economic necessity to pay agriculture a fair profit, the urban population will get its food and many raw materials below cost of production.

● PRICE FIXING or trick legislation cannot insure agricultural profits. These palliatives only insure a bigger volume. Net gains were never won by giving away produce; yet as long as our farmers continue to create more than we can consume, the majority of them will continue to work for little or nothing.

● CALL IT underconsumption, if you prefer the Pollyanna version of overproduction. Call it anything you like. The fact remains that too much is too much. We can consume only 2,150 lb. of food per year per capita. We cannot eat our surpluses in addition to our normal requirements because we are not built that way.

● FARMER STRIKES and the Farm Holiday movement—bitter medicine though they may be—show that at last agriculture is beginning to see dimly what is needed. These unhappy disturbances can result only in a clearer understanding of the effect on prices of the relation of supply to demand.

● ONLY FROM TODAY'S actual transactions are today's profits to be made. Underconsumption may explain their absence in part, but if farm products are to get a profitable price they get it only from the actual existing demand. That negative phase called underconsumption is out as far as current business is concerned. We can sell only what people will buy. For general prosperity there must be a balance of farm production with the needs of the nation.

...AS IT LOOKS TO US

Adhesive

A need of today is an adhesive which will stick cartons that are wax-coated and wrappers that are printed with oil-bearing inks. We have seen production delayed—even stopped—by cartons whose sealing flaps had been waxed where they should have been waxless, and by labels where oil in the ink gave the same effect.

To produce such an adhesive is not easy. Benzol or other solvents possessing odors or flavors, toxic or otherwise, are ruled out right from the start. It is cheaper to dump the offending cartons and labels than to ruin the product.

Who has it?

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Permanent

Hand-to-mouth buying is here to stay, despite apparent impending shortages in some lines of groceries. Chain stores of the larger type assure us that experience gained in the past eleven years has justified the policy of purchasing merchandise only for immediate needs. Their speculative profits have never been quite as large as their speculative losses. The chain store will try to make its merchandising margin at whatever price levels prevail.

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Reclosure

Somebody is overlooking a whole row of bets. Go into a pantry—yours or anybody's—and observe how few half-used packages can be reclosed so that they even remotely resemble their original smart appearance. After opening with a fork, a dull knife, or torn by "main strength and awkwardness," their tattered array is anything but a compliment to the goods. Simple, cheap cartons with a smart reclosure feature will build good will. The ideal is something that, like the cracker tin, looks good down to the last cracker.

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Homogenization

For the benefit of the younger customers who have not had the opportunity of experimenting with homogenizers, it should be pointed out that the results obtained by their use are not always what would be expected. Curiously, homogenization of tomato juice coming from the juice extractors shortens the "breaking" time—that period of time required to bring it to a boil. Those with experience in the cooking of tomato products realize what "breaking" a tank of juice means, and all of the attendant difficulties. By homogenizing the juice, however, it is possible to shorten the "breaking" time and do it at a temperature below the boiling point, thereby obviating, losses that are bound to occur if the batch boils over.

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Photo-Electric

What is the best application of the photo-electric cell in the food field? Tell us where you have seen it used and how effective it was. We have seen it only on bean sorters and on wrapping machinery. Surely there are other applications.

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After Ottawa—Trouble

When further announcements are made by the several units of the British Empire, we may expect to see approximations of the Canadian-U. S. tariff arrangements recently announced. It is now plain that the Ottawa Economic Conference has a sinister economic significance for the United States which was impossible of detection at the time, although one suspected trouble.

Fortunately, these new tariff barriers are not insurmountable. They are not prohibitive. The affected American producers and manufacturers, however, are faced with lower prices or diminished export volume. In either event there is only one avenue of escape from the results of Ottawa, and that is via lowered costs.

In the food industries the greatest effect will be felt by the southern states. One more economic force is added to the necessity of revision of southern agricultural economy because of restrictions on vegetable oil importations.

Looking farther into the future, it seems that as soon as the country is really aware of the true significance of current events there will be a general clamor for curtailing Philippine coconut oil imports. And if there is a Democratic national victory in November, the cries for Philippine independence coming from the cotton and beet sugar states will be deafening.

Unnecessary

Two men were killed by a fumigant in a macaroni factory a short time ago. One suspects the gas to have been hydrocyanic acid, which is a most effective agent but is dangerous in the hands of the novice. In the absence of detailed knowledge of the factory, it would seem that if a general fumigation of a macaroni plant was needed, the company had been guilty of very bad housekeeping or needed modernization of flour bins and flour-handling equipment.

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Needed

The general public still needs education about foods. Much harmful nonsensical gossip is being bandied about by otherwise intelligent women. Example: Two college women were heard by the editor to declare they were "absolutely positive" that, unless it contained a chemical preservative, Grade B pasteurized double cream would sour in less than five days in a mechanical refrigerator. They would buy no more of it!

We ask you, what good is perfect sanitation and technical control when it leaves an unexplained doubt that alienates customers?

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Not Needed

When modernizing, it is well to remember that surplus capacity does not need modernizing. Leaving surplus capacity unmodernized is a safeguard against price cutting. Modernized surplus capacity cannot increase sales but may prove as great a moral hazard as overinsurance.

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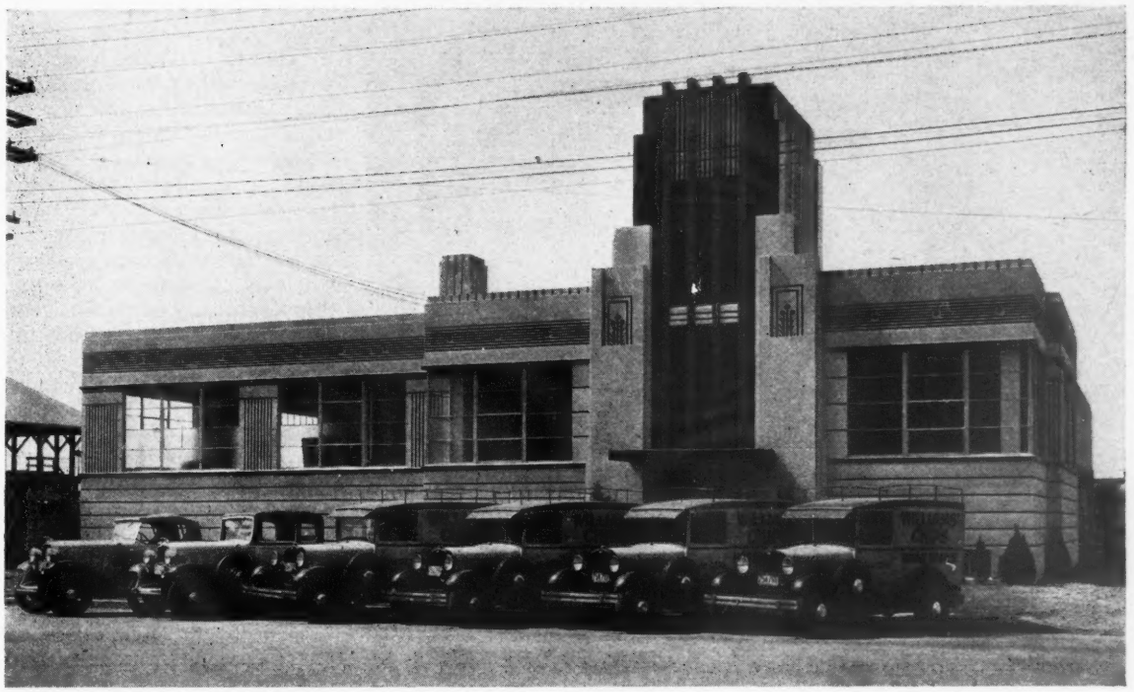
Hoe Your Own

Inquiries continue to pour in for detailed information on how to get into this or that business. Some come from the desperate and illiterate who could hardly be expected to understand that a complete answer in a letter is impossible. Some come from those who are already in business.

Few successful businesses have been started with virtually no capital or knowledge. Success is achieved by those who know their stuff. If the 1933 pasture looks greener on the other side of the fence, don't climb over. There are no known unexploited fields of food manufacture. If you are already in a business which you understand, hoe your own row and hoe hard!



Potato-Chip Plant Goes Modern

By MANDUS E. BRIDSTON
Seattle, Wash.

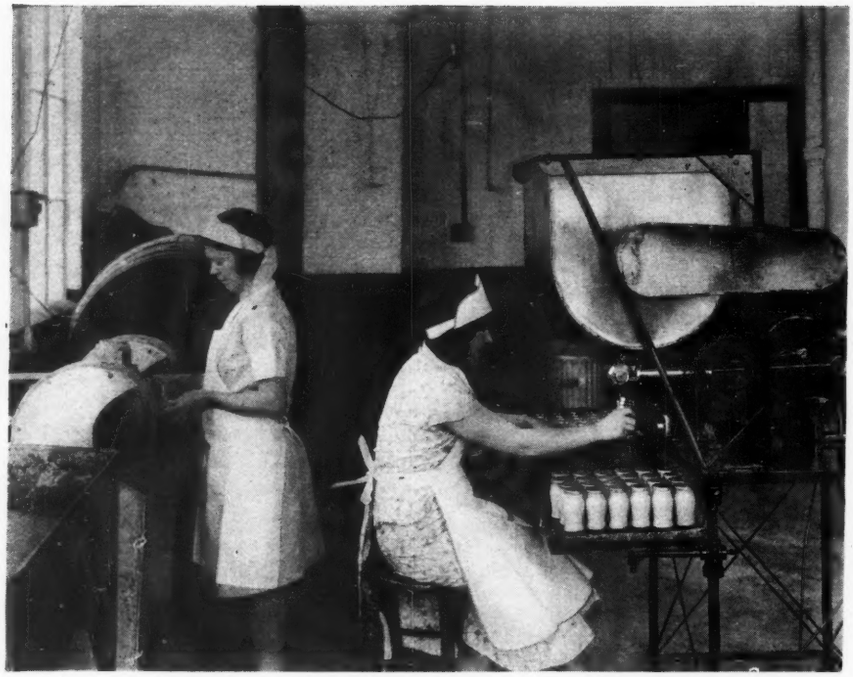
INDIVIDUAL food manufacturers are pointing the way to a new conception of industrial plants. They are placing emphasis on plants that embody beauty and esthetic appeal as well as industrial efficiency.

Comparatively speaking, only a few years has elapsed since the leaders in the baking industry broke away from the tradition of the dark, musty bake shop in congested districts and began to erect the now familiar daylight, sanitary type of bakery in more remote and less dingy and illy-kept localities. Canners, candy manufacturers, ice cream makers, and milk handlers have gradually adopted the same general type of plant building with variations to meet the needs of the particular industry.

In the main, these buildings are severe in their architecture; suggestive of cold, calculating, engineering efficiency and machine-age mass production. There is little about them to stir the imagination or to encourage their erection in residential districts where the people working in them can make their homes and rear their children under highly desirable conditions. In fact, residential districts resent the encroachment of these industrial plants and devise legal means of preventing their location in the better type of residential districts.

In the Middle West, a highly successful candy manufacturer startled his competitors three years ago by designing and erecting a candy plant which has more the appearance and setting of a country club house than an industrial plant. Inhabitants of the surrounding residential district regard the plant with pride and the candy manufacturer profits through recruiting his workers from this community of highly industrious and intelligent citizens.

Here and there, bakers and other food manufacturers have followed this lead and have given impetus to the adoption of a more decorative type of plant architecture. A new factor in the movement to combine architectural beauty with industrial efficiency is the horseradish and potato-chip factory of Williams & Co., Seattle, Wash. Situated so as to be sharply outlined against the skyline of the waterfront, this food plant stands in impressive relief before autoists driving down the broad expanse of Elliott Ave. The futuristic lines and angles of its walls and cornice, from which rises a cubical tower of glass panes, illuminated from within, are more suggestive of art than of industrialism. Painted in black and orange where the concrete is decorated with ornamental panels and indentures and consisting largely of windows for walls, it symbolizes cleanliness, orderliness and quality. It radiates a lasting impression of successful, constructive and confident management. It compels the passing



Individual motor for each processing unit in horse-radish department makes unsightly and dust-collecting belts and shafting unnecessary

public to remember it. Large Neon signs identify the products manufactured in it.

Quoting Frank E. Williams, manager and part owner, "This new type plant is not an expensive luxury. For just a few more dollars added to the cost of construction we have beauty and esthetic appeal in our building as well as efficiency. Boats coming into Elliott Bay are in direct line of vision of our plant. Our tower lights and Neon signs bring the building impressively to the attention of marine folk. Passengers on passing trains also see our plant. All of these are prospective consumers of our products.

"Furthermore, we who work in the factory take pride in the fact that we spend our working hours in a pleasing and beautiful place instead of in a glorified packing box. Consciousness of this pride stimulates the morale of our employees; makes them more efficient and happy in their work. This aspect alone is worth the additional cost of construction."

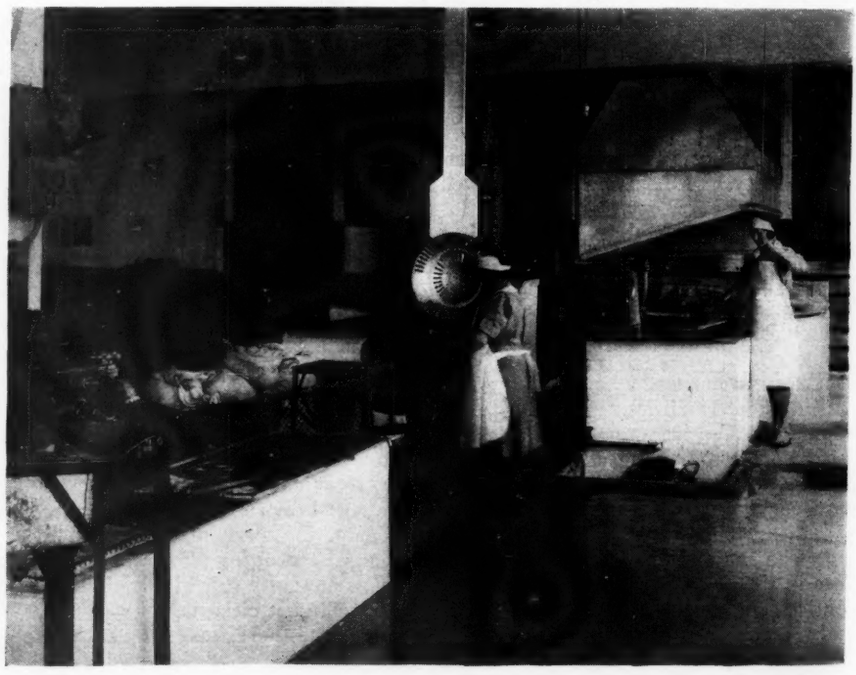
The striking exterior of the Williams & Co. plant is not a false front. The offices are not lavish. They are distinctive and in character with the rest of the plant. Paneled mirrors on walls and ceiling carry out the futuristic effect, as do the peculiar angular design of the door and window casings all painted black. The workrooms are all that the exterior suggests. Even the equipment is chosen or designed to do its part in the production of highly salable and increasingly demanded products in a manner that makes the worker take pride in and derive pleasure from his work.

Prior to 1910, the horse-radish roots were cleaned by hand-brushing and paring. During the course of a casual visit to a foundry, Mr. Williams noted a "tumbler"—a revolving barrel filled with rocks. He adopted this idea when designing a root cleaner. Last year the rocks were discarded for a series of baffles fastened inside a 100-gal. barrel, which is revolved by an electric motor through a speed-reduction gear. Water enters this barrel-vat through the hollow shaft on which it revolves. This unit enables one man to wash the roots that formerly required four women. Steel-brush buffer wheels, used in scouring the skins and blemishes from the roots, were taken from a tire repair shop, which uses such buffers to clean tires for vulcanizing. Labor and wastage due to trimmings are reduced 50 per cent each by the adoption of this ingenious idea. The bottling unit shown in Fig. 1, made by the Erie Electric Products Co., is another time and labor saver.

Through the adaptation of such units six carloads of horse-radish was ground by Williams & Co. last year in a compact and relatively small part of the plant. Only large tap roots, the highest grade, with few side roots are used. Practically all roots are obtained from St. Louis, because that locality is peculiarly adapted to the raising of horse-radish. Extreme temperatures appear to be needed to develop the desired characteristic strong flavor. Such conditions do not exist in the Puget Sound region.

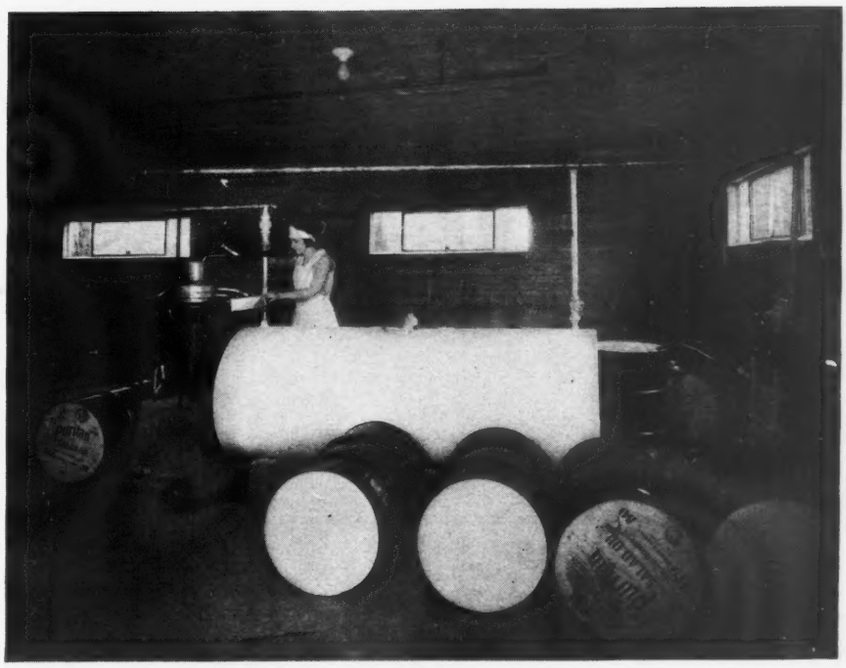
Equipment in the potato-chip section is just as original in design and application. The potatoes are peeled, in bag

Ventilator hood over cooking vat removes fumes and vapors and helps to keep temperature in cooking room as low as possible



lots, in a revolving unit which has an abrasive lining instead of baffles. They are sliced by means of a specially designed disk which is fitted, radially, with a series of knives and revolves through a vertical plane so that wafer-thin slices are cut as the potatoes are held against it by means of a movable lever in the troughlike feeding channel.

When the newly cut slices have been thoroughly washed in running water to remove surface starch and fiber particles they are placed in cotton mesh bags and spun as dry as possible in a standard laundry centrifuge. Open-mesh metal baskets containing 30-lb. batches of the dried chips are lowered into vats of high-grade vegetable oil heated to 350-375 deg. F. and cooked for about 3 minutes. Each vat, 6x2x2½ ft. and containing 125 gal. of oil, is made from heavy sheet metal and is set in a brick furnace heated by an oil burner. At one end of the cooking vat is a metal drain pan on which can be set two baskets of cooked chips so that the excess oil may drain, while hot, from the chips and into the vat. By this method of cooking and handling, each 100 lb. of sliced potatoes produces 30 lb. of finished chips containing 10 lb. of oil.



Overhead sprinkler system reduces fire hazard. Motor-driven pump lifts either fresh or clarified oil to cooking vat on floor above

The cooking oil is freed from particles of potatoes, which may char and lower the quality of the oil, by being run through a De Laval centrifuge clarifier once a day. Direct pipe connection permits the oil to drain from the cooking vat to the clarifier on the floor below and to be pumped back into the vat after clarification.

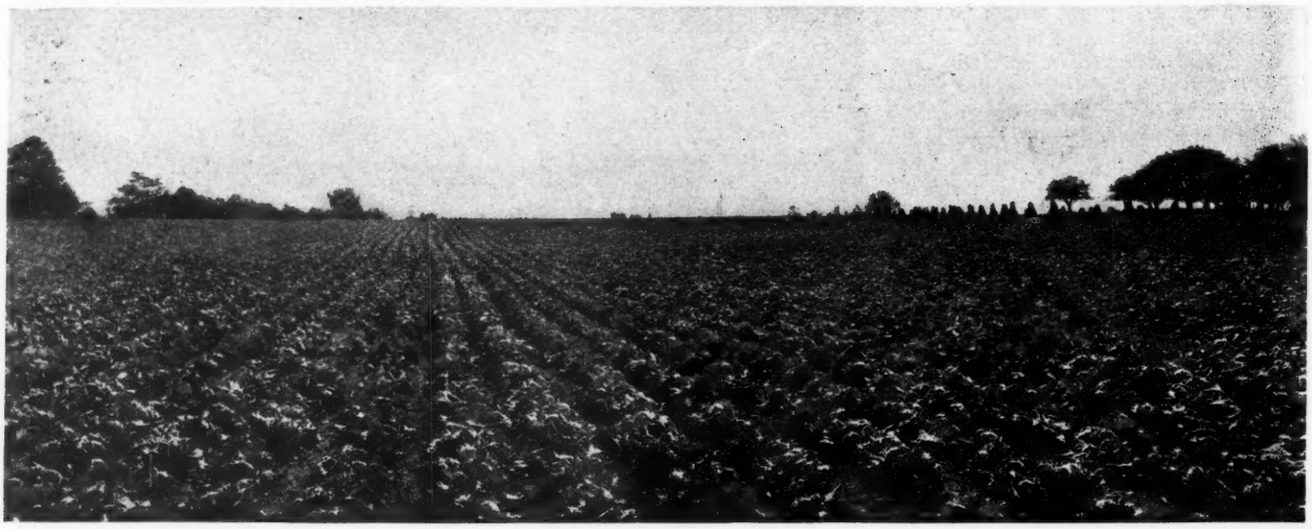
As soon as the excess oil has drained off, the chips are placed in trays set on a tiered turnstyle-type frame built in an opening between the cooking and the packing rooms. This arrangement permits transfer of loaded trays to the packing room and return of empty trays to the cooking room as wanted. Also this compartment is fitted with rodent-proof doors so that it may be completely closed up over night and week ends.

While still hot, though sufficiently cool to avoid melting the wax on the bags, the chips are weighed into printed glassine bags waxed on both sides and heat-sealed to prevent contact with moisture-laden air, which would tend to make the chips less crisp and fresh tasting. Corrugated paper cartons are used as handling and shipping containers.

Steel racks, mounted on casters and consisting of three tiers each, convey the loaded cartons from the packing to the shipping room for allocation to routes and finally to the loading platform. Incidentally, the loading platform is so built into the end of the plant that rolling steel doors can be lowered from the extended roof to make a garage for all the company trucks.

So successful has been the combination of ingenuity and practicality in plant equipment and operation with beauty and artistry of plant construction that 15,000 bags of potatoes as well as the six carloads of horse-radish roots are annually converted into profitable consumer products. Only fully matured potatoes, which have not been subjected to extreme chilling nor allowed to remain in the ground after the rainy season has set in, are used.

Finished chips are weighed and sealed in 2½- and 5-oz. bags from large metal trays setting on specially built work tables



Cabbage field in Finger Lakes district in New York State

Where Quality May Be Lost In Sauerkraut Manufacture

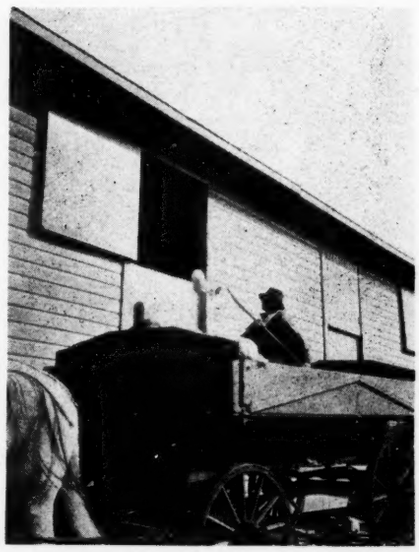
By CARL S. PEDERSON
New York State Agricultural Experiment Station
Geneva, N. Y.

This probably is the largest kraut plant in the world, located at Phelps, N. Y. It is constructed of glazed tile and is a part of the Empire State Pickling Co.

FOR CENTURIES the term sauerkraut, or "acid cabbage," has been applied to a product of the fermentation of cabbage. The definitions, although varying somewhat in standard dictionaries and encyclopedias, are all essentially the same. Today, because of its clarity in expression, the definition given in a regulation under the Federal Food and Drugs Act is usually accepted. This is: "Sauerkraut is the clean, sound product of characteristic flavor, obtained by full fermentation, chiefly lactic, of properly prepared and shredded cabbage in the presence of not less than 2 per cent nor more than 3 per cent of salt. It contains, upon completion of the fermentation, not less than 1½ per cent of acid, expressed as lactic acid. Sauerkraut which has been rebrined in the process of canning or repacking contains not less than 1 per cent of acid expressed as lactic acid."

A strict interpretation of the meaning and application of the definition and a strict adherence to it will ordinarily result in a high-grade product. The more one studies the problem of high-grade kraut, the more one is convinced that it can be produced only by the best of methods and most absolute control. One finds that the companies practicing these better methods are ordinarily successful.

According to Bitting (1929), sauerkraut had a very ancient origin. Apparently a product similar to kraut was prepared by the Chinese. But today kraut is thought of as a German dish and many of the methods of preparation are taken from the German homes. This leads to difficulties because of the lack of standardization. It is very apparent from the work of Conrad, Wehmer and Henneberg that ordinarily the



Forking cabbage into wilting bins

German people used less salt than is used today in preparing kraut and that they also desired a softer product. Apparently some yeast growth during fermentation was not considered objectionable and in some cases was considered desirable.

In the United States a large percentage of sauerkraut is made in factories and, of that made, a large quantity of it is canned. To describe good sauerkraut, therefore, it must be considered from the standpoint of preparation in the factory for canning purposes as well as its bulk sale. Properly prepared sauerkraut is a wholesome food product and one that has been increasing in favor. This is mainly due to the improvement in quality of a large part of the pack.

Kraut should have a clean acid flavor; should be fully fermented, and have a crisp, firm texture and a very light straw color. Sauerkraut that has been packed with the proper salt content at a temperature of from 60 deg. to 75 deg. F. in vats that are properly covered and weighted will have the crisp, firm texture desired. Smaller quantities of salt result in a softer kraut; in fact, if the quantity is lower than 1 per cent the kraut is ordinarily too soft to can. Larger quantities of salt inhibit the growth of certain desirable types of bacteria but allow the growth of other organisms such as pink yeast. Krauts packed at temperatures above 75 deg. usually have a slight butyric acid flavor. If the kraut is allowed to attain at least 1.60 per cent acidity, the bitterness of the cabbage will be almost entirely removed and, if secondary fermentation has not been allowed to take place, it will ordinarily have a clean acid flavor. Kraut on the surface of which yeast has been allowed to grow has an odor and flavor due to this growth. The odor is particularly undesirable and penetrates into the product, but the flavor usually is not quite so marked.

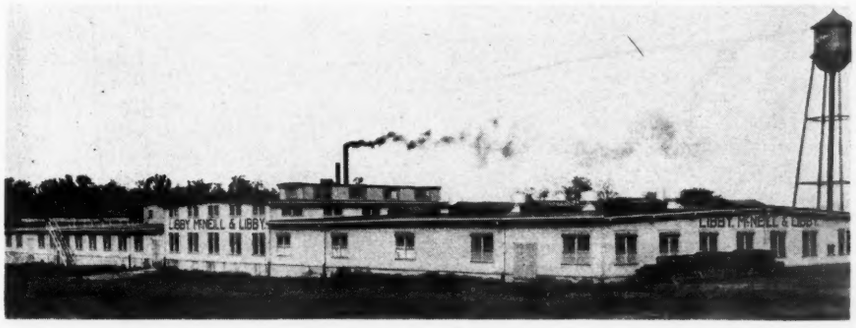
Color is rather difficult to define. Some krauts, especially those packed with low salt, tend to soften and bleach and thus are very white. On the other hand, as kraut becomes older it takes on more of a yellow tint, and although the kraut may be of high grade it may have a fairly deep yellow color. Yellowness in kraut, due to packing of green leaves; darkness, due to secondary fermentation; and pink tints, due to yeast growth and associated with over-salting, are all undesirable. All of these conditions have been noted. Another form of darkening noted in canned kraut is due to overcooking. It is not undesirable but is unnecessary. Overcooking has a further effect in that when the kraut is not fully fermented it takes on a flavor similar to a burnt turnip. A further fault in canning may be due to too much dilution with fresh brine, with a resulting flat taste or lack of flavor.

The faults in barreled kraut are many. Surface fermentation and darkening of color are very common, especially when stored for a few days in grocery stores or meat markets. They can be controlled to a considerable extent by proper covering, but this is seldom done. Barreled kraut is sometimes allowed to dry out, due to leaky barrels. This results in a considerable amount of spoilage due to yeast growth, and if the salt content is somewhat high, pink yeasts invariably develop, causing pink kraut. Unfortunately, also, barrels sometimes are used for purposes other than shipping kraut, such as dill pickles, spices and spicy products. Darkening of kraut may result from contact with such barrels. The kraut may also take on the flavor of the pickle or spice from the barrel.

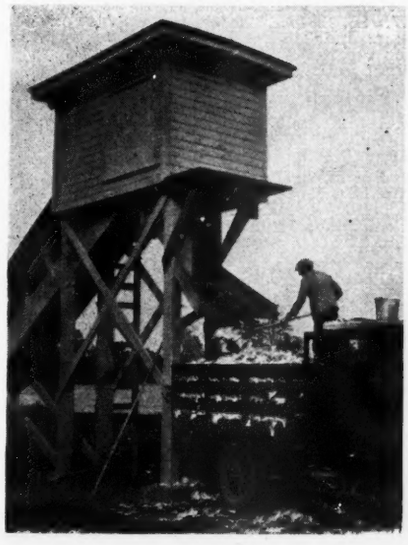
The first consideration in the preparation of kraut is the cabbage itself. There are a number of good varieties of cabbage, any one of which will make a good kraut. There are a few types, though, that do not produce solid white heads and a few which are more bitter than the average. Naturally, these should be avoided. Bitterness in raw or fermented cabbage is objectionable and, in some cases, may even carry through into the fully fermented sauerkraut. This is true particularly of certain strains of Danish cabbage.

The preparation of the cabbage for cutting and the subsequent cutting and packing in the vats are very important processes and should at all times be carefully carried out to produce high-quality kraut. Cabbage ordinarily is stored in wilting bins for at least a day previous to cutting. This insures cutting with the least amount of breaking of shreds. Cabbage should be carefully trimmed to remove all brown spots and all green leaves. Green leaves turn to a deep yellow in the fermentation and, if not removed previous to cutting, the kraut takes on the dark yellow tinge. Coring and cutting properly carried out are both essential to the preparation of nice looking sauerkraut as well as a uniformly fermented product. Where it is possible, washing the cabbage previous to cutting has been shown by Keipper (1931), Fred and Peterson (1932) to be very beneficial in producing a higher quality kraut. They have shown that many of the undesirable types of organisms are on the surface of the cabbage and can readily be removed by washing, while the beneficial types are within the head and are not removed.

Ordinarily the salt is added to the cabbage while packing in the vats, although some add it in the cart or carrier. Regardless of when the salt is added, it should always be added carefully, breaking up the lumps if any, and distributing it evenly. It is my opinion that, next to covering the vat properly, the addition of salt is the most important factor in the production of quality kraut. Dark spots, pink kraut, and soft kraut are very undesirable conditions and are related to salt content. The salt should be weighed accurately, although the quantity may vary from 2.0 to 2.5 per cent (Pederson, 1931) and still result in an excellent product. Because of the lack of uniformity in the use of and results obtained with a salometer it seems to be of little value in determining the quantity of salt in kraut brine. It is preferable that the quantity be



Kraut plants spread out over much area because of the great size of the tank house.



Cheap disposal of trimmings, consisting of the outer leaves, is quite a problem, for the trimmings will run from 4 to 15 per cent of the raw material

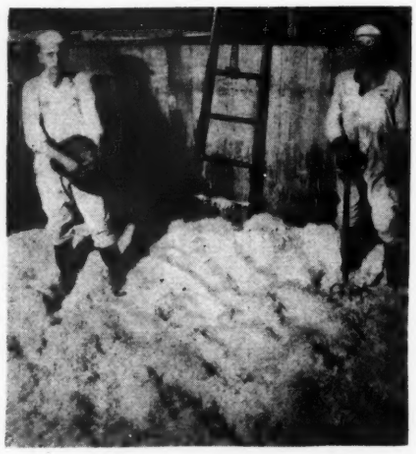
Trimming off the outer leaves

estimated in the finished product several days after packing, by titration with a standardized silver nitrate solution, and from this the quantity necessary may be accurately estimated and used in the packing of succeeding tanks of kraut.

Temperature is a very important factor in the fermentation of kraut. Two other factors must be considered, though: the quality of the kraut and the rate of fermentation. The work of Parmele, et al. (1927), and Marten, et al. (1929), has shown definitely that higher quality kraut is produced at lower temperatures—that is, up to 70 deg. F. On the other hand, later work (Pederson, 1932) has shown that under commercial considerations the rate of fermentation is extremely slow at colder temperatures. Cabbage stored and cut on cold days and in cold buildings may not be completely fermented for months. However, if the building is warm, cabbage is warmed somewhat in the preparation and cutting and, consequently, ferments more rapidly. Since kraut ferments so slowly at low temperatures and the kraut is not of high quality when made at temperatures above 75 deg. F., the most desirable temperature would appear to be from 65 to 70 deg. F.

As previously stated, the covering of a tank of sauerkraut is extremely important in the preparation of quality kraut. As has been shown (Pederson and Kelly, 1932) a large percentage of canned krauts packed in the United States show evidence of surface fermentation. This is caused by certain yeasts growing on the surface of kraut which is improperly covered and weighted. The yeast breaks down the lactic acid as well as the cabbage itself, producing byproducts which have a particularly penetrating odor. After the vat is filled with shredded cabbage, it should be covered with clean covers. A white muslin cloth placed between the cover and the cabbage is very desirable from the standpoint of cleanliness as well as in keeping the surface moist. The cover should be weighted so that the juice rises to the cover but does not flood the surface of it. The amount of weight necessary to accomplish this varies with the temperature and therefore it is necessary to change the amount of weight occasionally.

In an ordinary good kraut fermentation, three types of bacteria are the only organisms which develop (Pederson, 1930). The first type, the gas-producing, lactic-acid producing cocci called *Leuconostoc mesenteroides*, find conditions suitable for growth at a temperature of about 70 deg. F., and in the presence of 2 to 2½ per cent of salt. They act upon the sugar, drawn out by the action of the salt on the cabbage, changing it to lactic acid, acetic acid, alcohol, mannitol and carbon dioxide. The acid and alcohol form esters which produce some of the aroma of kraut. These organisms are killed off when an acidity of 0.7 to 1.0 per cent is attained.



Salting a tank of kraut. After every buggyful of cut cabbage is spread in the tank, a weighed quantity of salt is sprinkled over the mass. Workmen wear clean rubber boots, washing them every time they enter the tank.

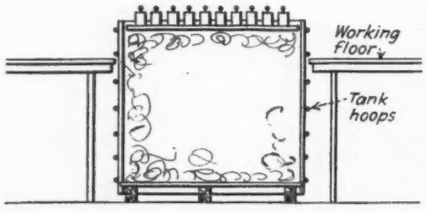
In the meantime, the two other types of organisms, which are inhibited slightly by the salt content and by low temperatures, have increased in numbers so that they may complete the curing of the kraut. The second of these types includes the two species *Lactobacillus plantarum* and *Lactobacillus cucumeris*. These produce lactic acid only from the remaining sugar, as well as from the mannitol produced earlier in the fermentation. They are finally killed off, leaving the third type of organism, *Lactobacillus pentoaceticus*. Their fermentation products are the same as *Leuconostoc mesenteroides*, but the organism may carry the fermentation to a higher acidity; sometimes up to 2.4 per cent acid.

The total result of the sequence of growth of these types is a typical sauerkraut. Any disturbance of the fermentation or any additional fermentation results in changes in kraut which are ordinarily detrimental, but in a few cases, distinctive flavors may be produced which are pleasing to certain individuals.

The kraut should be left in the tank until completely fermented. In several factories during the past few years, all of the vats of kraut over a few weeks old have been tested regularly for acidity. Knowing the stage of curing of a number of tanks at all times, it is a simple matter for the management to select that kraut for canning or shipping which is most completely cured as shown by acidity tests. Some of these packers have set a standard of 1.60 per cent acid. The packers who have tried the method are enthusiastic over the results, as they have found that their pack is far more uniform and also they do not have the trouble caused by opening vats of partly cured kraut.

If all the precautions for producing a high-grade product have been carried out, a kraut of high quality should be available for canning or for barreling. It is true that quite a little kraut is lost or spoiled after being barreled, but if packers and consumers will disregard the old notion that kraut juice is valueless and pack or accept barreled kraut with sufficient juice to cover the solid kraut properly, many difficulties will be overcome.

Section through a tank of fermenting sauerkraut to illustrate the method of pressing down the shredded cabbage by a wooden cover weighted down with paraffin-coated concrete blocks



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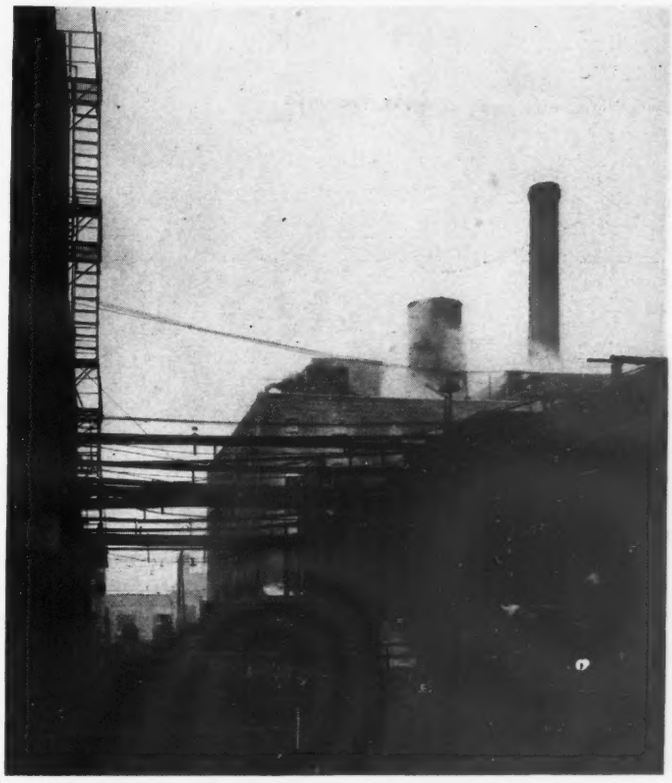
Centrifugal Economic Forces In the Meat-Packing Industry

By C. A. BENDER
New York, N. Y.



A typical view in Chicago stockyards includes one-horse two-wheeled trucks, stock cars, and much steam and fog.

WHEN the pioneer Chicago packers began shipping dressed beef across the continent, back in the seventies, the meat-packing industry entered upon a period of centralization which culminated during the World War with the concentration of almost 70 per cent of federally inspected slaughter and almost 50 per cent of total slaughter in the plants of the five largest packers. The discovery of this fact by the Federal Trade Commission was in large measure responsible for the Packers' Consent Decree of 1920 and the Packers and Stockyards Act of 1921.

That was the situation twelve years ago. What is the situation now?

Though statistics on the subject are far from complete, a careful study of available data reveals that: (*a*) the proportion of the total meat supply produced by the "big" packers has declined; (*b*) the proportion produced by small packers operating without federal inspection has increased; (*c*) the proportion produced by medium-sized packers operating under federal inspection probably has increased; and (*d*) the largest profits have been going in recent years to plants which do no slaughtering.

The proportion of all animals slaughtered under federal inspection which were killed by the "big" packers, according to the Armour petition for modification of the Consent Decree, declined from 69.3 per cent in 1919 to 56.5 per cent in 1929. These figures are not strictly comparable, since the latter includes only the output of Swift, Armour, Wilson and Cudahy, whereas the former also includes that of Morris & Co., which was later absorbed by Armour. The important point is that the difference between 56.5 and 69.3 per cent went to smaller packers, the largest of whom has annual sales less than two-fifths as great as the smallest of the "big four" and only about one-tenth as great as Swift or Armour.

The figures given represent the big packers' share of federally inspected slaughter, which is not, of course, identical with total slaughter. Many animals are killed under state and municipal inspection and under no inspection at all.

A computation from figures on wholesale meat production released by the Census Bureau, shown in Table I, indicates a small but progressive increase in the proportion coming from plants operating without federal inspection.

Corroborative evidence supporting the above conclusion is available in the annual reports of the Bureau of Animal Industry on the number of plants adopting and withdrawing from federal inspection. These figures, shown in Table II, indicate that the number of plants operating under federal inspection decreased during the period from 1925 to 1930 by 90. The total number of wholesale meat establishments in the United States, as reported by the Census Bureau, also decreased between 1925 and 1929, but only by 25. It is reasonable to assume, therefore, that there was an appreciable increase in the number of plants operating without federal inspection.

Further corroborative evidence that the packing industry has been tending toward decentralization is contained in figures compiled by the Bureau of Animal Industry on the net profit percentages of three classes of packers. These figures, summarized in Table III, indicate that the largest profits have been going to packers who do no slaughtering and the smallest profits to federally inspected slaughterers, with non-federally inspected slaughterers ranking in between.

A further breakdown of these figures for the years 1925 and 1926 was obtained by William Whitfield Woods, president of the Institute of American Meat Packers, and is summarized in Table IV. This table leads one to infer

Railroad siding in rear of a Chicago packing plant. Tank cars are in characteristic evidence.

an increase in the business of federally inspected slaughterers having a net worth between one and four millions as well as in the business of non-slaughterers and of slaughterers operating without federal inspection. Though these data on profits do not prove the existence of a tendency toward decentralization, it is reasonable to assume that business over a period of years will follow the paths of greatest gain.

The fact that the national packers are at a disadvantage on three counts has always been conceded: Their overhead is high, their transportation costs are high and their turnover is slow. Such disadvantages were more than offset in the pre-war period by three concomitant advantages: Large-scale production, which enabled them to spread their overhead over a large volume; the power to select the best markets for their surplus output, which resulted from their far-reaching branch-house and car-route organization and their control of transportation facilities; and their large-scale exploitation of the by-product industries, which is impractical for small packers because of the high cost of machinery.

New methods of distribution, coupled with certain restrictions imposed on the four largest packers by the Consent Decree, apparently have turned the balance in the last decade so that the disadvantages of the large packers have tended to outweigh their advantages. Many of their former assets seem to have turned into liabilities.

The large fleets of refrigerator cars which gave the national packers easy and, according to the Federal Trade Commission, almost exclusive access to the large consuming markets before the War are no longer the only means of moving meat from the point of production to distant points of consumption. Some big packers continue to charge up interest on the money invested in these vehicles without getting as much advantage out of them as they did in the past.

The large packers' branch-house and car-route systems, which were among the first means used to eliminate the middleman in food distribution, are no longer the only means of accomplishing this purpose. The large chains of retail food stores now eliminate the middleman from the other end. Instead of going to the packers' branches to do their buying, they go direct to the main plant, and the branches, deprived of this portion of their former business, still pile up approximately the same overhead. The independent retailers among their customers who have managed to survive the competition of the chains tend to order less and less, while the selling cost per order remains approximately the same.

Finally, the large foreign trade on which the large packers formerly depended to absorb a considerable portion of their output has in large measure disappeared. During the period from 1914 to 1920 the "big four" expanded their facilities in order to feed the Allied armies and the war-torn countries of Europe. It developed, however, that the war-torn countries of Europe, after the armistice had been signed, were much better able to feed themselves than had been anticipated and that some of their money was not worth much in terms of American dollars. The capacity built up by the packers to handle this trade remained, and the companies' bookkeepers continued to charge up interest and maintenance costs against it. One of the two largest packers operated in 1921 at 50 per cent of capacity. This occurred in the year following the signing of the Consent Decree, which forbade the "big five" to take up the slack in their plant and distributive capacities by adding groceries or by renting space in their refrigerator cars to distributors of other lines.

While the branch houses, car-route systems and surplus plant capacity of the large packers have been piling up overhead, new developments have made

Table I—Percentage of Total Wholesale Meat Production Not Federally Inspected

Calendar year	Percentage not federally inspected
1919	21.3
1921	21.0
1923	23.8
1925	22.7
1927	22.9
1929	25.9

Computed from data released by the Census Bureau and the Bureau of Animal Industry, U. S. Department of Agriculture.

Table II—Number of Plants Applying for and Withdrawing From Federal Inspection

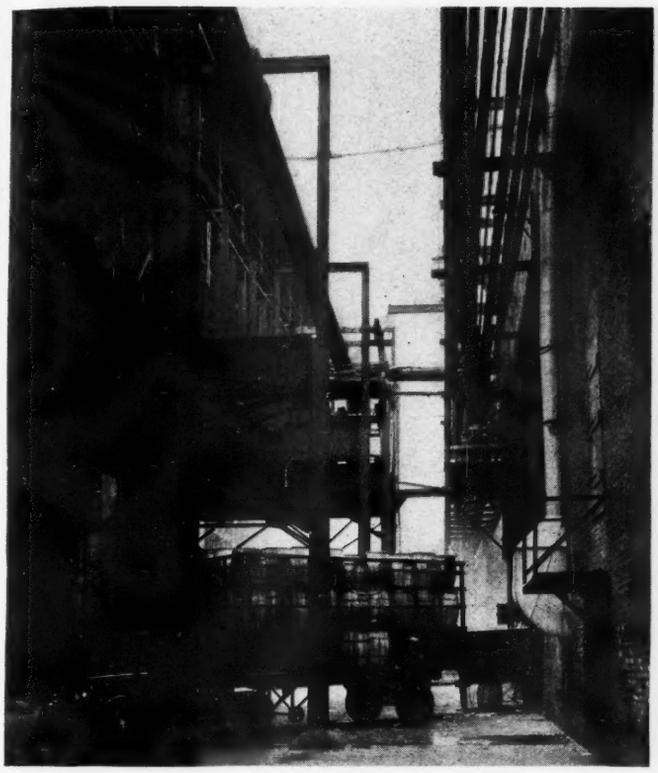
Year	Applications	Withdrawals
1925	42	44
1926	47	78
1927	25	64
1928	33	37
1929	27	34
1930	29	36
1925-30	203	293

Data from annual reports of the Chief of the Bureau of Animal Industry, United States Department of Agriculture.

Table III—Profits of Three Types of Packing Concerns, 1925-29

Fiscal year	Number of concerns reporting	Percentage of profits to sales	Percentage of profits to net worth
Federally Inspected Slaughterers			
1925	198	1.3	5.6
1926	198	1.3	5.1
1927	191	0.5	1.9
1928	193	1.3	5.7
1929	215	1.0	4.5
Non-Federally Inspected Slaughterers			
1925	141	1.5	7.6
1926	185	1.1	6.2
1927	215	1.7	9.1
1928	274	1.5	8.5
1929	372	1.3	7.3
Non-Slaughterers			
1925	175	5.2	15.4
1926	197	4.7	10.8
1927	205	5.2	13.6
1928	213	5.1	14.3
1929	245	5.8	15.7

Percentages computed from data in annual reports of the Chief of the Bureau of Animal Industry and in William Whitfield Woods' "The Present Status of the Packing Industry." Profits determined after deductions for income tax and depreciation.



Three levels of cattle runways over narrow street in Chicago stockyards.

Bacons made ready for shipment on trimming table are pushed down spiral to be packed.

life much easier for some of their smaller competitors. The small packers are not much hampered by their lack of branch-house and railroad equipment in selling to chains, and they are not as much hampered as they used to be in selling to independents. The instrumentality that has gained the latter advantage for the smaller packer is the motor truck.

In two respects the motor truck has distinct advantages over the refrigerator car: It can be moved on shorter notice and it can be used economically for hauling smaller quantities. Thus the big packer is no longer the only one who can select the best markets for his surplus. The smaller packer can send a truckload of meat to any point within from 75 to 100 miles of his plant as easily and quickly as his larger competitor. Better still, he does not have to pay the price of maintaining branch houses in distant markets, he does not have to pay any penalties on slack-filled refrigerator cars in order to enjoy this privilege, and he is under no economic obligation to ship anything at all to a given market unless he thinks he can sell it at a profit.

The small packer also is in a better position than he used to be in buying at public stockyards. This has been brought about by another agency: the far-flung market news service of the Bureau of Agricultural Economics. In 1918, according to the report of the Federal Trade Commission, the big packers had a virtual monopoly, through their control of stockyards and market newspapers, of market information. This monopoly, if such it was, has vanished. The small packer now receives his market information from the government. On the basis of this information he can telegraph an order buyer in any of the large markets for exactly what he wants.

Another factor favoring the small packer is the fact that he is not restricted from handling groceries or retailing or doing anything else that he deems necessary to keep him out of the red. If the small packer is not federally inspected he has still another advantage: He can buy livestock that would be rejected at a federally inspected plant, and buy it at a discount. The extent to which such packers actually use this advantage is unknown, but there is a widespread feeling in the trade that an appreciable number of animals that would not pass federal inspection are marketed at unofficial establishments. Finally, the small packer who operates without federal inspection has a considerably lower unit overhead than federally inspected competitors of similar capacity, as some of the plant conditions specified by the Bureau of Animal Industry as prerequisite to federal inspection are expensive. The Institute of American Meat Packers at its last convention took cognizance of these inequalities by officially launching a campaign for uniform state and federal inspection.

The large packers have tried, of course, to overcome such disadvantages as have developed by adapting their own organizations to changed conditions. They have decentralized their own operations to some extent, added motor trucks to their transportation equipment, developed new and improved products, and taken up the slack in their distributive organizations by dealing in such non-meat products as they were not forbidden to handle—notably poultry and produce. Available statistics indicate, however, that these measures have not proved sufficient to maintain their pre-war position in the industry.

Table IV—Profits of Packing Concerns by Net Worth Classes, 1925 and 1926

Year	Net worth	Number of concerns reporting	Percentage of profit to sales	Percentage of profit to net worth
Federally Inspected Slaughterers				
1925	Over 20 million	4	1.46	5.63
1926	Over 20 million	4	1.45	5.09*
1925	Over 4 million	9	0.58	3.02
1926	Over 4 million	11	0.71	3.72
1925	Over 1 million	34	1.82	8.81
1926	Over 1 million	34	1.40	7.54
1925	Under 1 million	151	0.76	4.34
1926	Under 1 million	149	0.58	3.46
Non-Federally Inspected Slaughterers				
1925	Under 1 million	141	1.51	7.58
1926	Under 1 million	185†	1.12	6.23
Non-Slaughterers				
1925	Over 4 million	4	8.93	18.25
1926	Over 4 million	5	7.52	11.14
1925	Over 1 million	9	2.48	8.05
1926	Over 1 million	7	2.08	5.10
1925	Under 1 million	162	2.47	12.56
1926	Under 1 million	185	2.37	11.91

Data from William Whitfield Woods' "The Present Status of the Packing Industry."

*Lower than should be, because two concerns changed their fiscal year and filed reports covering only eight and ten months respectively.

†Includes one concern with net worth over a million.

The Package Grows Up

By FRANCIS CHILSON
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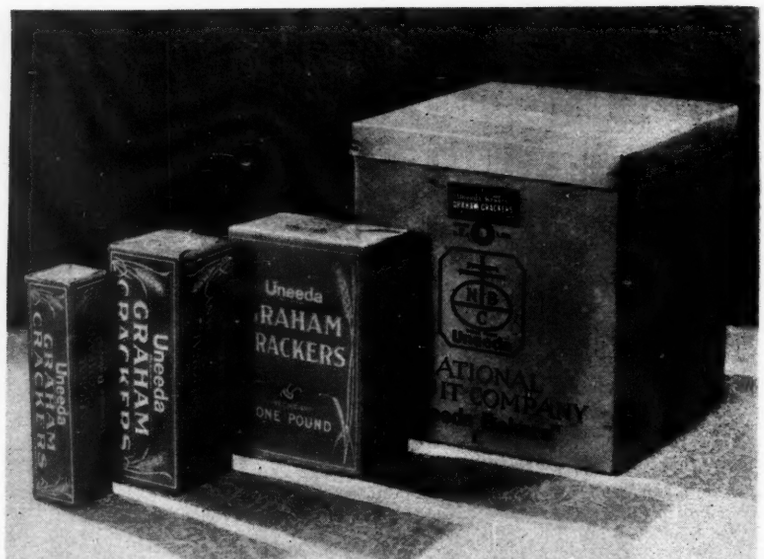
New York, N. Y.



Packages containing, respectively, 3 oz., 8 oz., 1 lb. and 9½ lb. of graham crackers. The 1-lb. package cost the consumer only 25 per cent more than the 8-oz. one.

Has the American food manufacturer, with his characteristic zeal to develop new commercial technique and his desire to create new attractions in his product, gone a bit too far with scientific packaging? Is the consumer getting wise to the high cost of the dainty little package and buying in larger quantities? Does the larger package have a place in the modern kitchen? The author presents an enlightening discussion on these questions and points out what certain progressive companies have accomplished with bigger containers.

WHILE economists and sociologists are praying for the great thirteen gods to send another Frederick W. Taylor to bring order out of the chaos caused by ruinously competitive selling and wasteful distribution methods, the average manufacturer is turning to package design in the fervent hope that despite merciless competition, despite costly distribution, it will somehow hold up sales.

This is a rather large order for package design alone, but the enthusiasm and faith of the American business man are boundless. It is characteristic of him to seize upon a new development in commercial technique with a zeal and singleness of purpose that blind him temporarily and lead to exaggeration and extravagance. With such unbridled enthusiasm, the Taylor system of scientific management was taken up, and for a while the factory without six gang bosses to every worker was a bit old fashioned. In time, enthusiasm cooled and a broader perspective obtained which rationalized or "humanized" scientific management and resulted in our great mass-production age. Cost accounting was taken up with equal zeal; "systems" were installed at exorbitant expense and the plant without thirty cost clerks was not in the swim. This, too, became rationalized, and standard costs — a method of guessing at costs with the aid of a stopwatch—became the accepted way of computing costs.

Then along came national advertising, which promised to abolish the old economic order, to scrap the laws of supply and demand. Emphasis shifted to advertising, and rivers of money were poured into it with an abandon that now makes many national advertisers regard the past with regret. Unfortunately, just at a time when national advertising was beginning to rationalize itself and advertising appropriations could be made with reasonably definite assurance of immediate concrete results, the old economic order suddenly girded up its loins and sallied forth to do battle with the invader—and the old economic order can still supply trouble and demand retrenchment.

Meanwhile, national advertising had given birth to a lusty offspring, packaging, which was scarcely out of its swaddling clothes before the crash came. Business men turned to this new technique and hailed it as an economic Messiah. And, as with management, cost control and national advertising, packaging is being carried beyond the bounds of good judgment. Too much of the consumer's dollar is buying package instead of product. Nevertheless, like all other enthusiasms which have carried American business forward at a tremendous rate, packaging is essentially a constructive influence. But it seems a pity that it is often allowed to dominate merchandising discussions when it should be treated as a single, although important, factor in merchandising technique.

Theories of packaging have been formulated with all the finality of ecclesiastical dogmas. We have been told that the package must connote its contents. We have been told that every product, willy-nilly, should be packaged in the smallest possible units, because space is not available in modern homes for the bulk packages of yesteryear.

The belief that there is limited storage space is, perhaps, the result of an assumption that housing conditions all over the country are like those in New York. But the census of population put the skids under that theory. It is shown that barely more than 50 per cent of the population of the nation is urban, and it is quite evident, since the figures include rural and suburban communities, that only a small part of the urban population actually lives under restricted conditions. Consider Chicago, Philadelphia, Baltimore, St. Louis and other first-rank cities; even the most casual survey will reveal that a large part of their respective populations still reside in one- and two-family houses. Even in New York City, many of the inhabitants, especially in the

outlying districts, live in homes of this type.

Furthermore, the tendency of modern building has not been to decrease storage space but to redistribute and increase it. It is true that the kitchen has decreased in size, but where the old urban kitchen had one cupboard, the smaller apartment kitchen has two and sometimes three. The kitchenette may be an American institution, but it is confined largely to our Greenwich Villages and our Park Avenues. And the small families for whom a kitchenette is sufficient are not very large consumers of packaged foods and household products anyway.

All of these considerations are being carefully weighed by progressive merchandisers, who are beginning to see the impracticability of packaging in units so small as to be uneconomical. Assisting the trend toward larger packages are department stores, which are featuring large packages of many staple commodities. And finally, the motive power is being supplied by Mrs. Housewife, who, owing to diminished family income, has become more keenly alert to the possibilities of saving pennies. She learns from the newspapers and from the radio that the poor farmer receives less than a cent a pound for his wheat, and she wonders why the beautifully packaged wheat cereal she uses should cost ten or fifteen times as much. Then she discovers that her favorite department store carries a similar cereal in a 5-lb. bag at one-third the per-pound price, and she becomes, as a result, more critical of all her purchases. She may find also that the dry beans and peas for which she is paying ten or twelve cents a pound in a pretty package can be bought in larger units at the department store for three or four cents. Straightaway she becomes convinced that when she buys from hand to mouth in packages she is paying as much for the pretty packages as she is for the goods.

The result of this reaction, as yet inchoate, is a definite trend toward larger packages of staple commodities, and the indications are that it will be followed by multiple packages for products which are consumed at a single sitting but usually purchased in units of three or a half dozen packages: canned tomatoes, soups and the like.

The Quaker Oats Co. decided there was a definite economic need for a larger package of oatmeal. Accordingly, it placed on the market a drum containing almost three times as much oatmeal as the regular package at a price only twice as great. The sales of the larger size are growing very rapidly, according to recent reports.

But one of the most striking examples of large-size packaging is that of the Manhattan Soap Co., whose success in a time of acute depression with a new product teaches a valuable merchandising lesson. This company decided that it would add soap flakes to its line, despite an apparent glut in the market. Before doing so, a very careful market study was made by F. G. Burke, vice-president in charge of sales. Mr. Burke realized that to add just another brand of soap flakes to an already overcrowded market would be bad merchandising. The product had to be given an economically sound and original appeal. His survey revealed that the customary small package of soap flakes was not sufficient for an average family wash, and he found that, despite the palaver of those who say that the family wash is now always done by laundries, it is still part of the average family routine. It was further discovered that the relatively high cost of packaged soap flakes had sustained the use of common laundry bar-soaps.

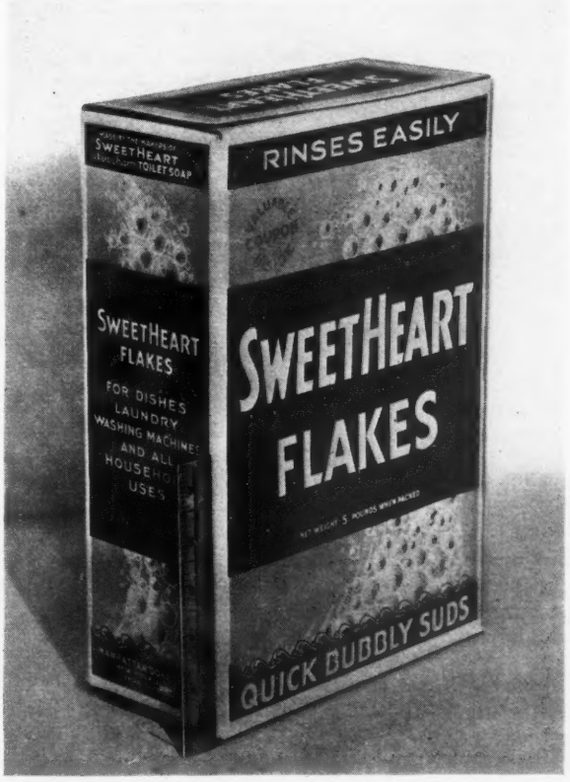
These facts, together with those regarding market conditions, the evident trend toward better values, the price of packaging materials and the cost of production, convinced Mr. Burke that the thing to do was to package up instead of down. Accordingly, the design laboratory of the Robert Gair Co. was commissioned to create a substantial package suitably designed which would contain 5 lb. This package was priced at about 50 per cent of the average per pound price. The success of the innovation was immediate, and in the few months the new product has been on the market, it has forged to the front and become one of the leading items in the company's line. This, we submit, is an excellent example of strategy and generalship in merchandising.

Now what are the advantages of the large package to the manufacturer? In the first place, there is a considerable reduction in the per-pound cost of packaging materials. Everyone knows that in many instances the price of the packaging materials for the small package is equal to or exceeds the cost of the merchandise put into it. At all events, the cost of packaging materials for the large package does not increase proportionately to its capacity. In the case of the Sweetheart soap flakes of Manhattan Soap Co., the carton does, of course, cost more, but only a very little more, than a small one, most of the differential being due to the larger amount of material needed to make the package, not to differences in fabrication costs.

The cost of filling the large package is but little more per unit, and very considerably less per pound, than the small package. The slight difference in unit costs is due to the fact that the larger package usually requires more time to fill, but as a rule the other packaging operations can be performed as rapidly for the large package as for the small one.

Handling, distribution and selling costs are very much less per pound than is the case with the smaller packages; the unit sale is greater, and this invariably boosts gross sales. In cases similar to Quaker Oats and Sweetheart soap flakes, fewer large units may be sold, but gross sales are large, and ton for ton, net profits undoubtedly are greater than with any of their competitors who are specializing in small packages.

There can be no question that the



Something new in soap-flake packages. This 5-lb. box of flakes has been favorably received, although introduced into a glutted market. While not a food package, the merchandising principles are the same

Hostess package of ginger ale, containing twelve bottles. Packages of this type offer advantages for units consumed at a single sitting

immediate future will see an accelerating trend toward larger packages. This will not, of course, eliminate the small package; it will simply mean that staple products will be marketed in two sizes. Olive and cooking oils, marmalade, syrups, mayonnaise, raw cereals, catsup, tomato juice and the like lend themselves to this treatment.

What is the prospect for the multiple package? This can be answered in part by pointing to the success of the "hostess" packages of Canada Dry and Hoffman's ginger ale and also to the "handy carrier" package of Coca-Cola. There are many products to which this idea might be extended, even though their nature is such that they are perishable and must be consumed at one or two sittings. Canned tomatoes, soups, peas, peaches, evaporated milk and similar products are consumed in large quantities by the average family, but only in small quantities at a sitting. Often these products, especially soups and milk, are sold in units of two, three or four for 25 cents. But the retailer is left to make up, and to vary, the deal at his own discretion. Is it not reasonable to suppose that sales of common products like these could be increased if packed in multiple packages of three, six, or twelve, depending upon the item, and sold as a unit at a price concession sufficiently great to appeal to the consumer's sense of values? The multiple package would not, of course, interfere with individual package sales. It would simply be used as a lure to buy the larger quantity.

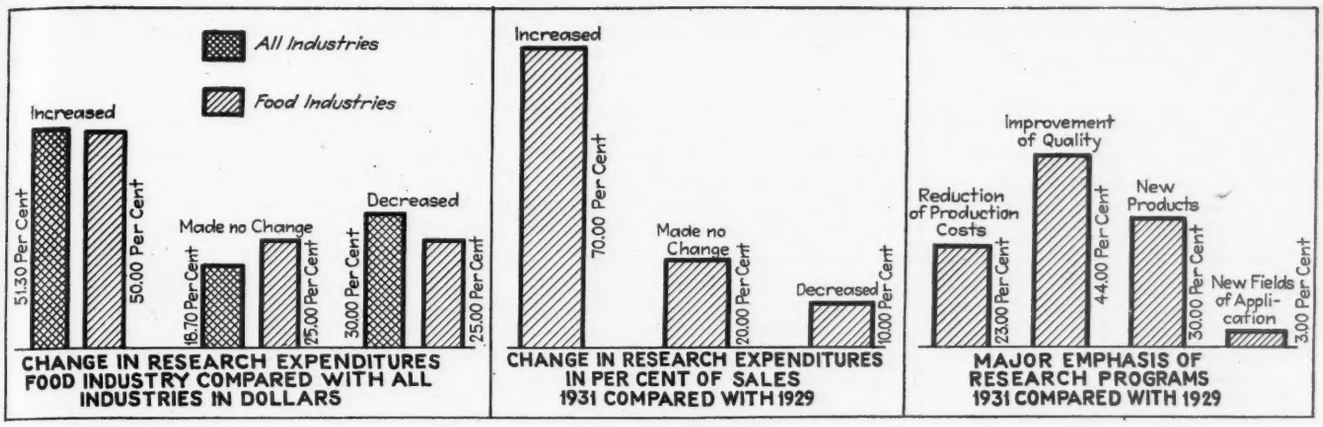
Another type of multiple package is the assortment package. Assortments are always difficult to make because of variety in tastes. But many household products which are consumed in small quantities might be sold in this fashion. Consider the possibilities of a convenient durable display carton containing an assortment of common spices: pepper, allspice, cinnamon, nutmeg, cloves, sage and so on. The average spice package is small, and invariably it is difficult to find when wanted. Moreover, many of them afford little protection to contents after opening. Although few housewives would have need for all the spices contained in any assortment, it is reasonable to surmise that a neat, convenient spice cabinet containing uniform packages which could be replaced when consumed would make a powerful appeal. Since the customary spice packages cannot easily be stacked after opening and often take up much space in the cupboard, it is reasonable to assume that many housewives would risk scrapping old spices in order to purchase the spice cabinet.

Assortments of most food products are difficult to make, but with some, like soups, a sales analysis reveals popular favorites. Very often it is possible to emulate the example of the drug and cosmetic industry in making up combination packages or assortments of popular products. A breakfast package containing a popular coffee and an assortment of popular cereals might well make an appeal at a time like this.

It is clearly evident that modern merchandising compels eternal vigilance and constant innovation. A market trend capitalized by one firm will be quickly followed by another, and in time the old dog fight for business is on again. In cases like that of the Manhattan Soap Co., for instance, such outstanding successes will bring other larger packages into the market, and when several have appeared, the novelty and appeal of the original is lost. The originator must depend on good will and fighting ability to hold his place in the market.

The words of Nicholas Murray Butler, president of Columbia University, describe, in addition to economists and statesmen, the kind of merchandisers needed today. "What we need now," said Dr. Butler, "are broad men sharpened to a point."

Coffee packed in the ordinary 1-lb. can and in the not-so-usual 5-lb. can. The large package enjoys a strong demand



Food Companies Increase Technical Research Expenditures

By MAURICE HOLLAND
and
W. SPRAGEN
Division of Engineering and Industrial Research National Research Council

RESEARCH, as much as anything else, has done away with a popular fallacy concerning the food industry. Only a few years ago this industry was generally considered too well established for a change to be possible or even contemplated. Today we can cite many changes that have taken and are taking place.

Here are a few of the results of research during recent years:

1. Tomato juice in glass and tin containers.
2. Whole grain corn in brine or packed dry in vacuum cans.
3. Irish potatoes canned in Florida.
4. New methods of sterilizing.
5. Fruit juices frozen to preserve their natural flavor.
6. New methods of preparing milk beverages from powdered milk and cocoa.
7. Fruit juices prepared by evaporation in a vacuum at a low temperature.
8. Electrical pasteurization of beverages.
9. New machinery for the dairy industry.
10. Canned cream of 35 per cent butter fat content.
11. Quick-freezing methods for food.
12. Fungus or mold control.
13. Sugar from hulls of cotton plant and from waste sawdust.
14. New products from peanuts.
15. Proteins from fermentation.
16. Standardization of bread and cake making.
17. Superior baking powders.
18. Use of hydrogenated oils in bakeries.
19. Use of lecithin prepared from soybeans as a fat stabilizer and dispersing agent in cakes, breads, oils, emulsions, ice cream, chocolate products and candies.
20. Use of evaporated and dry milk as ingredients of bread doughs.
21. Treatment of wheat and other foods with ultra-violet light to activate the D vitamin.
22. Production of milk with desired quantities of vitamin D.

Today is the age of vitamins. Tomorrow is yet to come.

To ascertain the comparative amount spent on research in 1931 as compared with that of 1929 the National Research Council, through its Division of Engineering and Industrial Research, distributed a questionnaire to the 1,600 companies maintaining industrial research laboratories. Approximately 30 companies from the food industry replied to the various questions placed before them by the council.

Fully 75 per cent of the reporting companies (Table I) either made no change or increased their research expenditures in 1931 as compared with 1929, and only 25 per cent actually found it necessary to decrease their dollar expenditures on research. Translated into percentages of sales, we find that fully 90 per cent of the reporting companies maintained or increased the percentage of sales on research work. An attempt was made to analyze these replies in terms of large and small companies as measured by the dollar expenditures on research. In general it may be stated that the small-, medium-, and large-sized companies apparently have found research a paying proposition. This is particularly noticeable when compared in percentage of sales. There is, however, a suggestion from this table that the larger companies in the food industry apparently have some advantage in capitalizing the results of their research work.

Table II is an analysis of the amount spent on research in percentage of sales. Of the reporting companies, 75 per cent are spending less than 1 per cent of their sales on research. This figure may be compared with 39 per cent, the average of companies of all industries that were devoting less than 1 per cent of their sales to research. Undoubtedly this fact is due to the comparatively small margin of profit prevailing in

the food industry, which depends very largely on large volume of sales. In fact, this figure of 75 per cent is exceeded by only two other industries: namely, the oil and the rubber industries. On the other hand, we do find a few of the food companies devoting from 1 per cent to 5 per cent and a still smaller number above 5 per cent of their sales to research work.

Some of the questions in the questionnaire issued were designed to bring out whether or not, in the opinion of these research directors, the food industry might be affected by future technical developments. Their replies are summarized in Table III. More than 81 per cent of the companies stated that, in their opinion, the industry would be so affected. The replies indicated that the smaller companies were practically unanimous in this opinion. The percentage decreased slightly with the size of the companies reporting. In other words, the smaller companies, especially, are looking to research to help them under the present business conditions. The smaller companies have generally not considered it desirable to devote their attention to the development of products or processes which might be useful to other industries. We find that less than 17 per cent of the smaller companies made contributions to other industries, as compared with 80 per cent for the large ones and more than 36 per cent for the medium sized companies. When it comes to their own industry, however, the small companies have all been able to develop new products which they have marketed during the past two years. All of these facts are brought out statistically in Table III.

Regardless of size (Table IV), all of the companies feel that research has helped them in making profits or limiting losses in the last two years.

Replies summarized in Table V relate to the question regarding the direction of emphasis of the research program in reduction of production cost, improvement of quality, and development of new products.

The major emphasis of the programs in the food industry, regardless of size, has been in the improvement of quality of products, although this emphasis in the case of the larger companies is shared with the reduction of production costs. In no case has the major emphasis been in the development of new products. This is entirely different from the results found in most of the other industries. In these other industries the trend during the past two years has been away from the reduction of production costs to the development of new products.

In 1928 a questionnaire was sent to a similar group of companies. At that time the emphasis was decidedly on the reduction of production costs. Ten out of fourteen of the food companies replying at that time were devoting

Table I—Change in Research Expenditures

Size of Companies as Indicated by Research Expenditures in 1931	Change in Research Expenditures in Food Industry in 1931 Compared With 1929							
	In Dollars				In Per Cent of Sales			
	Number of Companies Reporting	Increased	Made no Change	Decreased	Number of Companies Reporting	Increased	Made no Change	Decreased
		Per Cent				Per Cent		
Large (spent over $100,000)	4	50.0	25.0	25.0	2	50.0	50.0	0.0
Medium (spent from $10,000 to $100,000)	13	54.0	23.0	23.0	12	66.7	25.0	8.3
Small (spent under $10,000)	4	50.0	0.0	50.0	5	80.0	0.0	20.0
General (did not report size of expenditure)	3	33.3	66.7	0.0	1	100.0	0.0	0.0
All reporting companies	24	50.0	25.0	25.0	20	70.0	20.0	10.0

Table II—Research Expenditures in Per Cent of Sales

Size of Companies as Indicated by Research Expenditures in 1931	Proportion of 1931 Sales Income in Food Industry Devoted to Research				
	Number of Companies Reporting	Over 10 Per Cent	From 5 to 10 Per Cent	From 1 to 5 Per Cent	Under 1 Per Cent
		Per Cent			
Large (spent over $100,000)	1	0.0	0.0	0.0	100.0
Medium (spent $10,000 to $100,000)	12	0.0	8.3	16.7	75.0
Small (spent under $10,000)	7	14.3	0.0	14.3	71.4
General (did not report size of expenditure)	0	0.0	0.0	0.0	0.0
All reporting companies	20	5.0	5.0	15.0	75.0

Table III—Technical Developments

Size of Companies as Indicated by Research Expenditures in 1931	Will Be Affected by Future Technical Developments			Have Made Technical Developments Useful to Other Industries			Have Produced New Products Commercialized During Past 2 Years		
	Companies Reporting	Will Be	Will Possibly Be	Will Not Be	Companies Reporting	Yes	No	Companies Reporting	Yes	No
		Per Cent				Per Cent			Per Cent	
Large (spent over $100,000)	4	75.0	0.0	25.0	5	80.0	20.0	5	100.0	0.0
Medium (spent $10,000 to $100,000)	11	82.0	9.0	9.0	11	36.4	63.6	12	83.5	16.5
Small (spent under $10,000)	6	100.0	0.0	0.0	6	16.7	83.3	8	100.0	0.0
General (did not report size of expenditure)	6	66.7	0.0	33.3	5	40.0	60.0	5	80.0	20.0
All reporting companies	27	81.5	3.7	14.8	27	40.8	59.2	30	90.0	10.0

Table IV—Research as a Business Aid in Food Industry

Size of Companies as Indicated by Research Expenditures in 1931	Feel that Research Helped Their Companies Make Profits or Limit Losses in Past 2 Years		
	Number of Companies Reporting	Yes	No
		Per Cent	
Large (spent over $100,000)	4	100.0	0.0
Medium (spent $10,000 to $100,000)	12	100.0	0.0
Small (spent under $10,000)	7	100.0	0.0
General (did not report size of expenditures)	4	100.0	0.0
All reporting companies	27	100.0	0.0

Table V—Major Emphasis of Research Programs

Size of Companies as Indicated by Research Expenditures in 1931	Companies Reporting	Major Emphasis of Research Program in Food Industry				
		Reduction of Production Costs 1931 Per Cent	Improvement of Quality 1931 Per Cent	New Products 1931 Per Cent	New Fields of Application 1931 Per Cent	Byproducts New Materials 1931 Per Cent
Large (spent over $100,000)	5	40.0	40.0	20.0	0.0	0.0
Medium (spent $10,000 to $100,000)	13	23.0	38.5	30.5	8.0	0.0
Small (spent under $10,000)	6	17.0	50.0	33.0	0.0	0.0
General (did not report size of expenditure)	6	17.0	50.0	33.0	0.0	0.0
All reporting companies	30	23.0	44.0	30.0	3.0	0.0

their major research activity to this item. The food industry apparently has found it necessary or desirable to improve the quality of product or bring out new products in obtaining its share of the consumer's dollar.

As the analyses thus far reported were not entirely satisfactory, the study was carried still further to see whether those companies which increased or decreased their expenditures for research did so because of their opinion as to the future trends of technical developments in that industry. The analyses of this study are summarized in Tables VI-IX. We find that, regardless of whether the research expenditures were increased or decreased, about 80 per cent of the companies felt that they would be affected by future technical developments, although none of the companies which decreased their expenditures was able to make developments useful to other industries. On the other hand, they were equally effective in the marketing of new products. These facts are brought out both in Table VI, in dollar expenditures, and in Table VII, in expenditures in per cent of sales. All of the companies were positive in their statement that research was of a distinct business aid (Tables VIII and IX).

Table X shows the comparison in the change of research expenditures in 1931 with 1929 in the food industry and all the other industries. This indicates that the food industry follows very closely the average of all industries in that 30 per cent of all reporting companies decreased their dollar expenditures in research and only 25 per cent of the food industry did so. In terms of percentage of sales, however, the number which decreased their research expenditures in the food industry is slightly higher than the average for all industries.

The food industry has some outstanding examples of cooperative research. Some of these trade associations are numbered among those having the highest annual expenditures in research work. Notable examples are the work of the Institute of American Meat Packers, National Canners' Association, California Fruit Growers' Exchange, Glass Containers Association, Biscuit Manufacturers' Association, and Edible Gelatin Manufacturers' Association. There are a number of others which are contemplating cooperative research work. This trend toward cooperation in research is due to one or more of the following reasons:

1. Necessity for getting together to compete with other industries.
2. Elimination of duplication and reduction of expense.
3. The desirability of maintaining quality standards for the industry.
4. The influencing of public opinion.
5. Greater research facilities available to an association.
6. The advantage of pooling knowledge.

With the greater development of scientific knowledge in this country and its application to health we can expect that the food industry will be in a position to take advantage of these new developments and their utilization for the good of mankind.

Table VI—Technical Developments in Food Industry

Change in Dollars Spent on Research 1931 Compared with 1929	Will Be Affected by Future Technical Developments: Companies Reporting	Yes (Per Cent)	Possibly (Per Cent)	No (Per Cent)	Have Made Technical Developments Useful to Other Indutries: Companies Reporting	Yes (Per Cent)	No (Per Cent)	Have Produced New Products Commercialized During Past 2 Years: Companies Reporting	Yes (Per Cent)	No (Per Cent)
Companies who increased	11	82.0	9.0	9.0	10	40.0	60.0	11	82.0	18.0
Companies who made no change	4	75.0	0.0	25.0	4	100.0	0.0	5	100.0	0.0
Companies who decreased	5	80.0	0.0	20.0	5	0.0	100.0	5	100.0	0.0
Companies who did not furnish figures on expenditures	7	86.0	0.0	14.0	8	37.5	62.5	9	89.0	11.0
All reporting companies	27	82.0	4.0	14.0	27	41.0	59.0	30	90.0	10.0

Table VII—Technical Developments in Food Industry

Change in Per Cent of Sales Devoted to Research 1931 Compared with 1929	Will Be Affected by Future Technical Developments: Companies Reporting	Yes (Per Cent)	Possibly (Per Cent)	No (Per Cent)	Have Made Technical Developments Useful to Other Industries: Companies Reporting	Yes (Per Cent)	No (Per Cent)	Have Produced New Products Commercialized During Past 2 Years: Companies Reporting	Yes (Per Cent)	No (Per Cent)
Companies who increased	11	82.0	9.0	9.0	12	42.0	58.0	13	85.0	15.0
Companies who made no change	3	100.0	0.0	0.0	3	33.0	67.0	4	100.0	0.0
Companies who decreased	1	100.0	0.0	0.0	1	0.0	100.0	1	100.0	0.0
Companies who did not furnish sales figures	12	75.0	0.0	25.0	11	45.0	55.0	12	92.0	8.0
All reporting companies	27	81.0	4.0	15.0	27	41.0	59.0	30	90.0	10.0

Table VIII—Research as a Business Aid in Food Industry

Change in Dollars Spent on Research 1931 Compared with 1929	Feel that Research Helped Their Companies Make Profit or Limit Losses in Past 2 Years: Number of Companies Reporting	Yes (Per Cent)	No (Per Cent)
Companies who increased	10	100.0	0.0
Companies who made no change	5	100.0	0.0
Companies who decreased	5	100.0	0.0
Companies who did not furnish figures on expenditures	7	100.0	0.0
All reporting companies	27	100.0	0.0

Table IX—Research as a Business Aid in Food Industry

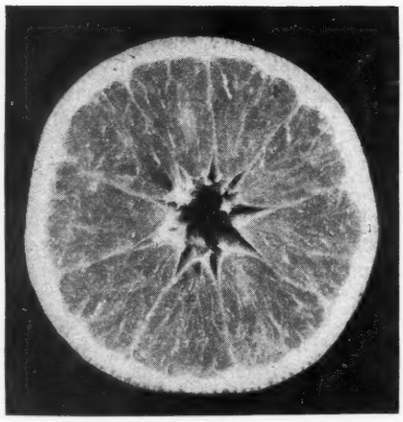
Change in Per Cent of Sales Devoted to Research 1931 Compared with 1929	Feel that Research Helped Their Companies Make Profits or Limit Losses in Past 2 Years: Number of Companies Reporting	Yes	No
Companies who increased	12	100.0 per cent	0.0 per cent
Companies who made no change	3	100.0 per cent	0.0 per cent
Companies who decreased	1	100.0 per cent	0.0 per cent
Companies who did not furnish figures on sales	11	100.0 per cent	0.0 per cent
All reporting companies	27	100.0 per cent	0.0 per cent

Table X—Food Industry Compared With Other Industries

	Change in Research Expenditures 1931 Compared with 1929: In Dollars: All Industries, Per Cent	In Dollars: Food Industry, Per Cent	In Per Cent of Sales: All Industries, Per Cent	In Per Cent of Sales: Food Industry Per Cent
Increased	51.3	50.0	75.3	70.0
Made no change	18.7	25.0	15.7	20.0
Decreased	30.0	25.0	9.0	10.0

Preventing Off Flavors In Orange-Juice Manufacture

By B. C. COONS
Coons Fruit Machinery Co.
Rochester, N. Y.



Cross-section of a Valencia orange

EVERYONE who has been connected with the manufacture or sale of orange juice knows that a huge sum of money has been spent and lost during the last three years in the experimental work and actual production of orange juice, yet none of it has reached the degree of perfection demanded by the public. Many who have worked on this proposition seem not to have considered this most important question to the extent of finding the answer before they went into production. Why is it more difficult to satisfy the public on orange juice than other fruit juices? What does the public demand?

Practically everyone making and serving orange juice seems to think that all the juice coming from an orange by pressing or extracting, with the exception of the oil of orange, constitutes a good orange juice. This particular juice is one food product that imitators have never been able to duplicate with any degree of success.

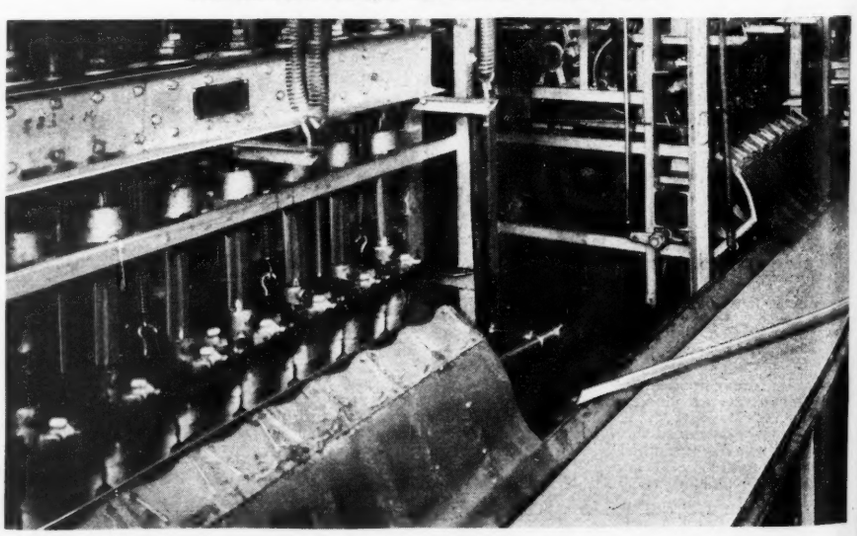
Our definition of a satisfactory pure orange juice is: the actual juice from ripe oranges containing from 5 to 10 per cent of the juice-cell pulp, without any of the undesirable solids in it. The best orange juice we have ever made is the actual juice from ripe Valencia oranges, mixed in the ratio of 50 per cent from Floridas with 50 per cent from California Valencias. This gives the sweetness and excellent flavor of the Florida fruit blended with the color and tartness of the California fruit.

One of the methods used last year by a large corporation to make several hundred thousand gallons of orange juice was recommended by a chemist. The procedure was to buy all varieties of oranges and use them, whether mixed or separately. The yellow peel was removed by a peeling machine; the fruit was inspected by hand, then dropped into a press which extracted the juice. At this point they failed to produce the quality of juice which the public demands, because during the pressing process, part of the rag, or rag juice, and other undesirable solids were ground and churned together, after which the juice and the pulp were passed through a revolving separator where an effort was made to separate the undesirable portions from the juice. It was impossible, of course, to separate the flavors by means of a mechanical sieve. At the same time the juice was permitted to absorb considerable air. The temperature of the workroom was about 80 deg. F., which also was the approximate temperature of the juice. The next step was to pump the juice into a vacuum freezer and freeze it into the form of an orange slush or sherbet-like substance, then fill this into waxed-paper cups and freeze at a temperature of —10 deg. F.

There are many reasons why this orange juice was not satisfactory and would not maintain its original flavor in the frozen state or after defrosting. It has been asserted that handling the peeled fruit by the human hand for inspection introduced considerable bacterial contamination, but this hardly seems to be a factor. The real difficulty with this juice was that, although the firm desired a juice containing 10 per cent of juice-cell pulp, it did not realize that there is a considerable difference between the flavor imparted by juice-cell pulp and rag pulp. By this method of manufacture, the rag-pulp flavor could not be eliminated. Both rag and rag juice will ruin the flavor of orange juice quickly after extraction.

Another process was used by a different corporation, which also froze many thousands of gallons of orange juice. The first step was to buy all varieties of oranges, then wash and clean the fruit, after which they were run through a machine which cut them into halves. This operation cut also the skin and seed, which had the effect of allowing the flavors therefrom to mix with the juice. These halves of oranges then were transferred to slow-moving buzzers, which removed the juice, pulp and a portion of the rag. By this method considerable of the undesirable solids of the orange was introduced into the juice. The pulp and juice were

This machine for automatically pressing the juice from halves of oranges was used in 1931 in Florida



then transferred to separating devices in an attempt to remove the undesirable solids from the total juice, which, of course, left considerable soluble material and finely divided solids in the juice.

Several firms on the Pacific Coast have made thousands of gallons of juice by cutting the oranges in half and reaming or buzzing the juice from the skin, placing it in 30-lb. tin cans, and then freezing the mass in the cans, shipping it East to be defrosted, after which the juice was separated from the pulp. This method also failed.

Other attempts have been made to pack orange juice in bottles with the use of preservatives, and this has not been very successful. Canners have attempted to pack orange juice in tin cans and sterilize it by heat. Three of the most prominent of these packers admit that the method is not a technical success.

In the attempt to solve this problem of production of a successful orange juice, and its preservation, attention should be directed to three important factors. First, oranges, from which a real tasty pure orange juice can be made are available for about four months of the year. During about two months of the year, Florida and California Valencies can be obtained for extracting and blending together. For many reasons this blending can be done only in the northern states. Second, different localities in the country demand a different quantity of pulp in the juice and it also appears to the writer that a blended juice probably will be necessary for a successful commercial product. Third, chemists who have been working on the problem appear to have given more attention to the elimination of enzymes or their destruction than they have to the elimination of the undesirable flavors and solids, in the preparation of the juice. Our experience has been that it is possible to make a pure orange juice that will last over a year in frozen form and hold all of its desirable qualities, *if the undesirable portions of the orange are kept out of the juice,* instead of attempting to remove them from the juice once they have gotten in.

Of the three known ways to preserve orange juice: namely by the use of heat, preservatives, and freezing, the first two have to be discarded as unsatisfactory. An orange juice that is entirely free from seeds or seed flavors, oil of orange, rag juice, ground rag, or any part of the orange except the juice or juice cells, will change in flavor anywhere from immediately to a period a few months afterward, when preserved by the freezing method. This is because extraction of the juice must take place at a very low temperature to prevent the rapidly functioning enzymes which are present in oranges from having an opportunity to react with the oxygen of the air. To extract the juice at a temperature sufficiently low and free from undesirable solids has required the development of special equipment that will operate successfully in a room whose temperature is 10 deg. F.

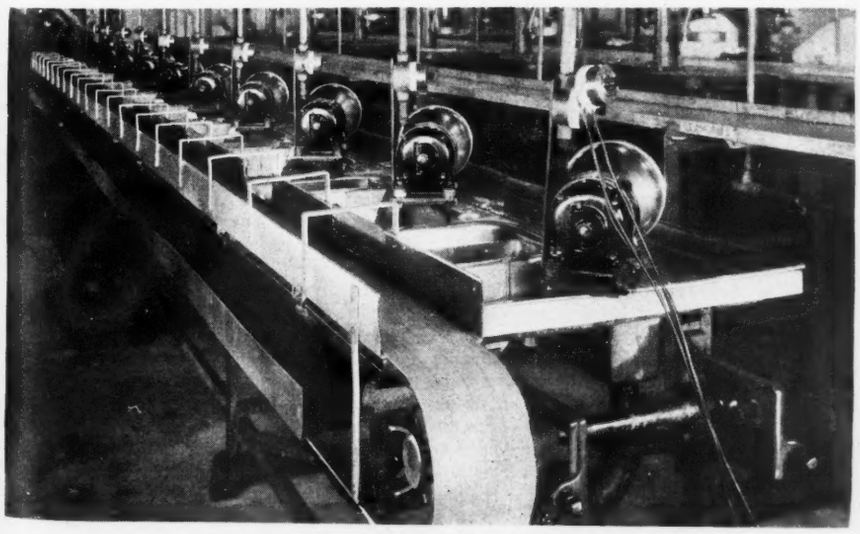
When juice is prepared in a manner which eliminates the possibility of inclusion of seeds, seed flavors, oil of orange, rag juice or ground rag, at a temperature of 10 deg. F., it can be filled into paper cups, glass jugs, or enameled tin cans and frozen successfully. Juice which has been in storage for fourteen months made under these conditions is not different from juice prepared at the moment.

The length of time in which pure frozen orange juice, free from unsatisfactory solids, remains palatable after defrosting depends a great deal upon the extent to which undesirable solids are mixed with the juice; the amount of oxidation; or how much bacterial contamination takes place between the time the juice leaves the juice cell and the time it is frozen. There also appears to be another factor about which the evidence is not entirely conclusive: Odors in the air of the extraction room seem to have an adverse effect on palatability retention.

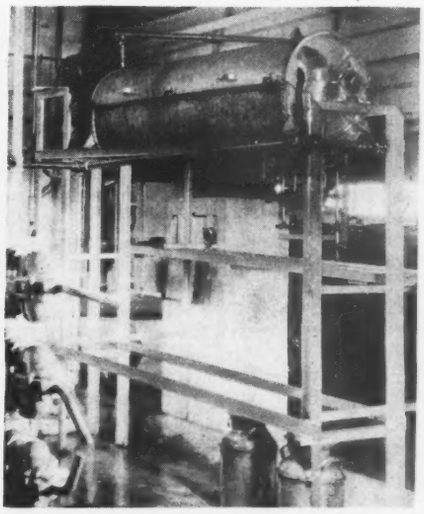
Although the method previously described is a technically successful method of preparing a satisfactory pure orange juice for preservation by freezing, we believe that the most successful way to sell and distribute orange juice at a profit will be to produce the juice locally in the larger cities where cold-storage facilities are available. The yield of juice is about 4¼ gal. per box of Florida oranges and about 3½ gal. per box of California oranges, both varieties being Valencias. A blend of the juice of these two types of fruit on a 50-50 basis produces the best possible quality of orange juice. It seems desirable to conduct the peeling, pressing, and freezing operations in definite localities, for the reason that the population of many regions have individual preferences in regard to the quantity of juice-cell pulp in the juice. There is no better container for orange juice than the orange itself, and probably the best ultimate solution for shipment of orange juice for long distances it to ship the oranges to a near-by point before extraction.

A further economic feature of this type of business will be found in the probable necessity of buying the oranges directly from independent growers to be shipped loose in cars rather than to attempt to purchase from the packers or distributors in the cities. This will save the grading, packing and container cost.

A battery of reamers to buzz out the juice and pulp from halved oranges; used in Florida in 1931



Seeds and pulp were removed from orange juice in this rotary sieve, which is a modification of the tomato pulper. The refuse, or pomace, discharged from the tube at the top and fell into the milk cans below. The strained juice passed through sanitary pipe to subsequent de-aerating operations



The Boston Conference On Retail Distribution, 1932

By O. FRED ROST
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New York, N. Y.

UNANIMOUS in the conviction that business has definitely "turned the corner" and is on the mend, speakers at the fourth Boston Conference on Retail Distribution, recently held at the University Club, Boston, Mass., contributed an exceptional volume of material that will prove valuable to manufacturers of food products. Throughout the four sessions the discussions served to emphasize that manufacturers of all classes and types of consumer goods must recognize a community of interest which makes it possible for each to gain valuable data and knowledge through hearing a discourse on the problems of the other, even if an unrelated line of products is involved. Thus, for instance, since all activities in the field of retail distribution are addressed to the same group, the 125,000,000 American consumers, every food manufacturer will be interested in the several studies of the consumer and consumer demand that were presented at the conference.*

The need for more scientific approach to problems of consumer demand was ably pointed out by Paul T. Cherington, president of the American Marketing Society. Methods of measuring consumer demand were discussed by L. D. H. Weld, director of research, McCann-Erickson, Inc. In an address on "What Does the Consumer Want," Loring A. Schuler, editor of *Ladies Home Journal*, contributed some valuable data and quoted from letters to demonstrate how superior in intelligence and knowledge the consumer of 1932 is compared to those of former years. The unmistakable conclusion was that manufacturers cannot hope to gain the best results of advertising and sales effort unless they take into account an intimate knowledge of what the consumer needs and wants. The broader aspects of "The Consumer and Distribution" were analyzed by E. St. Elmo Lewis, marketing counsel.

Of direct and immediate interest to manufacturers of food products was the discussion by Victor H. Pelz, director, American Institute of Food Distribution, Inc., on the various types of voluntary chains and significant trends developed by them. According to studies conducted by the Food Institute, at least 71 per cent of all voluntary chains sell coffee under private label; 44 per cent have their own brands of canned vegetables; 37 per cent have private brands in canned fruit; and 18 per cent have a general line of canned goods.

In addition, 29 per cent reported use of private labels on pepper, condiments and spices; on flour, 28 per cent; on oatmeal, 24 per cent; on evaporated milk, 23 per cent; on alimentary pastes, 19 per cent; on mayonnaise, salad dressings, jellies and preserves, 18 per cent; on flavoring extracts, 17 per cent; and on catsup, 15 per cent. These percentages do not reflect the full extent of this trend because they are based on the number of chains and not on the number of units. Actually the use of private labels accounts for a much more substantial percentage of the total sales volume of these products.

Dr. Pelz predicted that in the future every producer of food products will find himself forced to deal with a comparatively small number of organizations, which, however, will be found in control of a major portion of the entire market for his product.

Voluntary chains were classified as a move toward the integration of distribution, which may become a permanent factor in the distribution of food products if the regular centrally owned chains "continue to squeeze the independent retailer" and if their operating mechanisms and systems can be perfected sufficiently and rapidly so that the results "can parallel the basic operating advantages of the regular chain." If the developments of the future should indicate that centrally owned chains have reached their competitive peak, then the average independent retailer "may once more give vent to his desire to be his own boss."

Speaking on the subject "Growth of Merchandising Through Coin Device Automatic Units," H. W. Alexander, president, H. W. Alexander Co., gave some interesting details of the rapid strides made by automatic units as factors in the distribution of various food products. He quoted that a chain of automatic restaurants feeds 500,000 persons daily and does an annual volume of $30,000,000. The penny-in-the-slot gum and chocolate machines on station platforms in New York City are reported to "take in" $5,000 daily, and a single "Sodamat" station established a record of 24,204 sales of a 5-cent beverage in a single day at one of the Atlantic Coast resorts.

Six basic requirements were cited for successful selling through coin devices, namely: (*a*) proper packaging or provisions for on-the-spot consumption; (*b*) building consumer demand through proper advertising; (*c*) the packaging must be small enough for the storage of ample stocks within a dispensing unit of reasonable size; (*d*) goods must be delivered to the consumer in prime condition, regardless of weather and temperature; (*e*) the price per unit should not exceed 25 cents; (*f*) the articles sold through mechanical devices must be standardized; "nationally advertised brands sell far better through coin device machines than unbranded lines."

A typical operation of selling candy through coin device units was cited to show for each dollar of sales at retail a breakdown of costs approximately as follows:

Cost of product	$0.35
Cost of restocking and collecting	0.15
Commissions to owners of locations	0.20
Overhead and depreciation	0.20
Profit	0.10
	$1.00

While no complete statistics on the growth of automatic selling appear to be available, one manufacturer alone is said to have sold over 600,000 coin-operated units and asserts that each of these machines has paid back to the owner the original investment and a satisfactory profit.

Manufacturers of advertised products were particularly interested in the address by Gilbert H. Montague, of the New York Bar, on the subject "Changing the Anti-Trust Laws to Improve Merchandising." He suggests that the U. S. Department of Justice and the Federal Trade Commission should cooperate and create in their examining and legal divisions "special bureaus to give expedited attention to all violations of standards of conduct, codes of ethics, and trade practice conference rules reported to these governmental bodies by any trade institute or trade association, whenever those standards, codes and rules are so framed as to paraphrase the existing law." The Fair Practice Code, recently adopted by a committee of national advertisers, Better Business Bureaus, and various manufacturing and retailing executives was recommended as "exactly suited to the present-day needs of distribution."

Other outstanding contributions included studies of specific problems of distribution. The relationship between manufacturer and retailer was discussed by George M. Godfrey, vice-president, Continental Baking Co.; "Prices as a Factor in Making Retail Sales," by Oswald W. Knauth, of R. H. Macy & Co., who related some interesting experiences in the world's largest retail establishment; a study of consumer demand based on the rate of replacement, by T. H. McNiece, provides a means for measuring replacement markets when applied to specific lines; and the question of rising marketing costs was discussed by Wm. H. Lough, president of Trade Ways, Inc.

Substantially the Boston Conference on Retail Distribution contributed a wealth of new data and information that will have to be taken into account by every manufacturer who desires to stabilize the retail distribution of his product with a full knowledge of the changed conditions that prevail today in every branch of distribution.

*Printed copies of the entire proceedings of the Boston Conference on Retail Distribution may be obtained from Daniel Bloomfield, manager, Retail Trade Board, 80 Federal St., Boston, Mass.

ABSTRACTS OF CURRENT LITERATURE

FROZEN PACK: STUDIES ON FRUITS FROZEN IN SMALL CONTAINERS. J. M. Lutz, J. S. Caldwell and H. H. Moon. *Ice and Refrigeration,* Vol. 83, pp. 111-113; September, 1932.

In the preservation of peaches, strawberries and apple cider by the frozen-pack method, rapid freezing has no marked advantages over slow freezing. More oxidation and more discoloration of peaches followed rapid freezing, as well as resulting in greater corrosive action on tin containers. Special low-temperature equipment is not required for the fruits studied.

* * *

BIOCHEMISTRY OF ALUMINUM. K. Mackenzie. *Biochemical Journal,* Vol. 26, No. 3, pp. 833-845 (1932).

Aluminum additions to the diet have no perceptible influence: (*a*) when the diet is adequate for growth and reproduction in the rat; (*b*) when the diet is insufficient for growth or maintenance; (*c*) when fed to several successive generations of rats. Aluminum absorption from such diets appears to be exceedingly small.

* * *

SEPARATION OF VITAMIN A AND CAROTIN. P. Karrer and K. Schöpp. *Helvetica Chimica Acta,* Vol. 15, pp. 745-746 (1932).

A solvent of about 10 per cent methyl alcohol and 90 per cent petroleum ether is used for extraction of vitamin A from butter or egg yellow. This solution is allowed to stand in a vertical pipe filled with fibrous earth. The absorption layers form with vitamin A in the upper one, and carotin in the lower layer. Spectroscopic examination shows the separation to be complete.

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PRODUCTION OF VITAMIN D IN A GLOW DISCHARGE. F. A. Askew, R. B. Bourdillon and T. A. Webster. *Biochemical Journal,* Vol. 26, No. 3, p. 813 (1932).

It is practicable to produce vitamin D in quantity in a glow discharge. The current used was 150 to 250 milliamperes, alternating at 50 cycles from a transformer with a voltage of 2,000.

* * *

VITAMIN B FACTORS IN MILK. L. T. Samuels and F. C. Koch. *Journal of Nutrition,* Vol. 5, pp. 307-324; May, 1932.

Biological analyses show that commercial evaporation of cows' milk destroys about one-sixth to one-fifth of the anti-neuritic heat-labile fraction of vitamin B. There is no identifiable destruction of the heat-stable, growth-promoting fraction during commercial evaporation. The question of the identity of this heat-stable factor with the anti-pellagra fraction is still unsettled.

RICE BRAN VITAMINS. Sator Ohdake. *Proceedings of the Imperial Academy of Japan,* Vol. 8, pp. 179-82; May, 1932.

Following previous work on the isolation of the anti-neuritic vitamin in a pure state from rice polishings, the earlier results have been confirmed, and the vitamin has been purified even further than before. Its hydrochloride has been obtained in a state of analytical purity, in a yield of 1.6 grams from 11.5 kilograms of rice polishings. Yeast, as well as brown rice, has anti-neuritic potency, as indicated by the fact that both Japanese and German workers have obtained vitamin preparations from yeast, in which the potent factor is evidently the same oryzanin which has now been isolated from rice.

* * *

ALUMINUM AS PACKING MATERIAL FOR CANNED GOODS. G. Lunde. *Tids. Hermetikind.,* Vol. 18, pp. 205-216 (1932). [From *Chemical Abstracts,* Vol. 26, p. 4887; Sept. 20, 1932.]

Aluminum is suitable for packing canned goods, especially sprat sardines, and herring sardines in oil, kippers, fresh herring and fish balls. This metal is not resistant to tomato products and others which are highly acid or salted. Its employment must be temporarily limited to products that are not too acid or salt; otherwise hydrogen swells may occur.

* * *

RADIOACTIVITY AND VITAMINS. A. G. Hogan and others. *Journal of Nutrition,* Vol. 5, pp. 413-420; July, 1932.

Vitamin A of milk fat is destroyed by exposure to radioactive substances. The beta ray apparently is the active agent. Vitamins B, C, D, and G are stable when exposed to beta or gamma rays.

* * *

MICROBIOLOGY OF CANNING. W. D. Bigelow and E. J. Cameron. *Industrial and Engineering Chemistry,* Vol. 24, pp. 655-658; June, 1932.

Preservation by canning depends upon the "effective sterilization by heat of the food material and subsequent protection against contact with a contaminated environment. The necessary "process" for effective sterilization depends upon the initial contamination of the product, and recent work has shown the necessity and means for control of contamination sources.

* * *

ISOLATION AND IDENTIFICATION OF VITAMIN C. W. A. Waugh and C. G. King. *Journal of Biological Chemistry,* Vol. 97, pp. 325-331; July, 1932.

Experimental methods are described and a microphotograph of crystals of vitamin C is shown. The pure, crystalline material has an extremely high degree of potency.

CAUSES OF DAMPENING OF CRYSTALLINE SUGAR. R. Svatek. *Listy Cukrovar.,* Vol. 50, pp. 430-431 (1932). [From *Chemical Abstracts,* Vol. 26, p. 4974; Sept. 20, 1932.]

Crystals of completely dried sugar became damp due to condensation of water upon their surface during temperature changes and formed a film of syrup. Because of the high specific heat of the sugar crystals, the temperature changes in the sugar during storage are slower than in the air; under such conditions the air may be in contact with colder crystals. Dampening was prevented by heating storehouses to maintain a constant temperature and avoiding gradients between the sugar and the air.

* * *

HEATHER HONEY. H. W. de Boer and L. C. E. Kniphorst. *Chemisch Weekblad,* Vol. 29, pp. 526-34; Sept. 17, 1932.

Beekeepers in regions where bees have access to heather (*Calluna vulgaris*) or heath (*Erica tetralix*) have learned that the usual centrifugal treatment will not satisfactorily separate heather or heath honey from the comb. However, stirring the heather honey in its cells increases its fluidity so that it can be centrifuged. This peculiar behavior arises from the fact that heather honey can undergo reversible change between the sol and gel states. No rise or fall of temperature is required to effect the change. Careful study of the honey on this basis has pointed the way to solving the problems of objectionable retention of air bubbles in centrifugal heather honey and of satisfactory crystallization.

* * *

FACTORS AFFECTING FILTERABILITY. R. F. Puckett. *Facts About Sugar,* Vol. 27, pp. 249-252; June, 1932.

Improvement in filtration efficiency follows: (1) development of boiling methods so as to produce the maximum proportion of sugar from high purity massecuites; (2) increasing the polarization of sugar by washing it in the machines to a higher polarization; and (3) filtering the syrup through kieselguhr. The quality of the low-grade sugar returned to process exerts an influence on filterability. Increasing the pH of syrup by addition of soda or of lime solutions depresses the filtration efficiency.

* * *

REFRIGERATION AND REFRIGERANTS. *Industrial and Engineering Chemistry,* Vol. 24, pp. 601-630; June, 1932.

A series of articles by a number of authors discusses the commonly known refrigerants as well as Freon, dichloromethane and dichloroethylene.

* * *

FERMENTATION CITRIC ACID. Arnaldo Corbellini and Oberto Canonici. *Giornale di chimica industriale ed applicata,* Vol. 14, pp. 355-63; July, 1932.

The citrus fruit industry in Italy is seriously menaced by the increasing production of citric acid from molasses, and even from cheap sugar in Belgium, Czechoslovakia and America. In an experimental study of the merits of the fermentation method, glucose and sucrose mashes were fermented with various strains

of *Aspergillus niger*. *Penicillium* and other organisms were considered unsuitable for commercial use. Of the *Aspergillus* cultures, those cultivated on increasing concentrations of citric acid, to accustom the organism to the acid, showed no increase in yield of citric acid, but alternate cultivation on agar-malt and lemon juice greatly increased the power of the organism to produce the acid.

* * *

DEGREE OF GRINDING OF FLOURS. A. Heiduschka and R. Fischer. *Pharm. Zentr.*, Vol. 73, pp. 337-339 (1932). [From *British Chemical Abstracts*, B, Vol. 51, p. 655; July 29, 1932.]

The ash, phosphorus pentoxide, furfuraldehyde, and pentosan contents of rye and wheat flours are in direct proportion to the degree of grinding of the flours. The largest relative differences occur in the pentosan values.

* * *

VITAMIN EFFECT ON GROWTH. B. Sure. *Journal of Biological Chemistry*, Vol. 97, pp. 133-139; July, 1932.

Vitamin B stimulates the appetite and thus produces growth by increased food consumption as well as causing a specific influence on growth, unrelated to the plane of nutrition. Animal feeding tests show that as little as 1 to 2 mg. of vitamin concentrates, as a source of vitamin B complex, produced a *specific* influence on growth.

* * *

CHEMICALLY COMBATING INSECT PESTS OF FOODSTUFFS. R. C. Roark. *Industrial and Engineering Chemistry*, Vol. 24, pp. 646-648; June, 1932.

Ethylene oxide, ethylene dichloride and propylene chloride, alone or preferably in admixture with carbon dioxide, are the newest, most effective, and safest materials for fumigating foodstuffs. The pyrethrins are effective contact insecticides and are non-poisonous to man, but their use is limited by high cost. Rotenone, a compound under experiment, appears to approach the nearest of any known material to the requirements for an ideal insecticide.

* * *

DEVELOPMENT OF THE ESCHERICHIA-AEROBACTER GROUP OF BACTERIA IN BUTTER. B. W. Hammer and M. W. Yale. *Journal of Dairy Science*, Vol. 15, No. 3 (May, 1932), pp. 199-208.

Low temperatures and salt have striking influences in retarding growth of these organisms in butter. The cumulative effect of salt and temperature indicated that growth may occur in salted butter at about 18 deg. C. and in unsalted butter at about 7 deg. C. In general, results obtained on the organisms of the Escherichia-Aerobacter group in butter are in agreement with the results that have been reported for varied flora. The Aerobacter species is of greater importance in butter deterioration than the Escherichia because of its predominance in numbers in off-flavored butter and because it produces an objectionable odor and flavor. Even the Aerobacter species can have considerable growth in butter without any evident influence on odor and flavor.

WHAT'S ON YOUR MIND?

Ripening of Albumen

To the Editor of FOOD INDUSTRIES:

Dr. Rahn's article covering the subject "Why Cream or Egg White Whips" points out some of the fundamentals which undoubtedly affect the quality and whipping power of dried egg powder. We should now hear from someone as to what the substance is which depresses the surface tension, accumulates on the surface, and solidifies there.

Experience of the writer shows that egg albumen is at first glance one of the most inconsistent acting materials there are. Very slight changes in temperature, cleanliness of containers, and such things affect the resulting finished product. The method of drying and temperature of the dryer also play an important part in determining results. The process must be controlled very closely at each step.

Apparently it is necessary to break down the albumen from a complex, viscous form to one which is thin and of low surface tension. So far, the most successful means of accomplishing this has been through a ripening process, either with or without enzymes. It is much easier to make a dry product which will whip satisfactorily from eggs which have been aged for some time; however, that is not entirely necessary. There are a number of methods which can be used to break down the albumen in just a few hours. The writer has never seen any which was very successful, however, which took less than 24 hours. A further thought is that tray-drying methods usually require a shorter ripening period than where the spray method is used. This is logical, for it is apparent that with the tray method, which requires a day or more, there is a certain amount of ripening which takes place during the drying process. The spray method of drying is, of course, instantaneous.

Dr. Rahn's suggestion of presence of a material which lowers the surface tension is borne out in practice. It is also apparent to the writer that this lowering of the surface tension must be done in a certain manner, for numerous tests have shown that the mere fact that the surface tension has been lowered does not necessarily mean that a powder made from the liquid will whip. The other factor probably is that the material must be such that it is of the type which accumulates in the surface and *solidifies* there. Apparently there is a close relationship between the pH of the liquid and its foam stability. The pH is not nearly as important as is sometimes thought, however, except from the standpoint of palatability of the finished article. Good whips have been obtained from liquids testing from pH 5.0 to pH 10.

Tests have also shown that the powder itself after manufacturing is subject to change. Frequently it will either improve or entirely lose its beat with age. Various treatments of the powder itself have been shown to increase the whip as much as 1 in., when measured by the standard 3-minute test.

In summing up these comments it appears that from a practical standpoint there is much to substantiate the principles put forth in Dr. Rahn's article. However, further work is needed to show just what the exact nature of the change is which takes place in ripening of albumen. It should be noted that albumen powder of good beat and no objectionable odor is being manufactured in this country today in commercial quantities, both by the spray and the tray-dried processes. The writer is of the opinion that there are at least two types of action which go on in the ripening of the albumen: First, there is the action on the sugars and carbohydrate materials, and, second (most important from whipping standpoint), there is also a proteolytic action which tends to reduce the proteins to a more simple form having lower surface tension and less viscosity.

A. W. FARRALL
Consulting Engineer and Director
Douthitt Laboratory

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Fermentation

To the Editor of FOOD INDUSTRIES:

I read with interest your editorial in the July issue of FOOD INDUSTRIES under the caption "Help Wanted," and the various replies printed in the August and September issues of your paper.

It is not my intention to enter into a discussion or a debate as to whether or not the Eighteenth Amendment should be repealed. I am, however, greatly interested in the fermentation industries and in applied bio-chemistry, and I know from experience that the surplus agricultural crops of most countries could be used up as industrial raw materials by the various fermentation industries.

From figures published in World's Trade Notes, Chemicals and Allied Products, by the U. S. Department of Commerce, it is evident that in a little country like Czechoslovakia, citric acid produced by fermentation has increased in such large amounts that the exportation of fermentation citric acid in one year has increased by over 950 per cent.

In a large number of countries, in order to decrease the country's dependence on foreign gasoline, laws have been enacted making the blending of alcohol with the imported gasoline compulsory. Such laws are already in force or in course of enactment in the following countries: Argentina, Australia, Austria, Brazil, Chile, China, Colombia, Czechoslovakia, Esthonia, Finland, France, Germany, Hungary, Italy, Japan, Latvia, Panama, Philippine Islands, Poland, Rumania, Sweden, Turkey, Union

of South Africa, and Uruguay. In each of these countries the aim is to make the country self-sufficient and to use up surplus agricultural raw materials.

In Germany alone the compulsory admixture of alcohol for motor fuel, which had been only 3 per cent in 1930, and is now 10 per cent, has increased the alcohol consumption for motor fuel purposes by 300 per cent in two years.

Brewing and malting are highly scientific processes. Today, a large variety of important chemical products previously obtained by organic or synthetic chemical methods are produced economically and efficiently by fermentation. The production of bakers' yeast, or acetic, butyric, citric, lactic, oxalic, and the other acids, in addition to acetone, butyl alcohol and glycerin, has nothing to do with prohibition, and no one knows better than a chemist the important relationship of alcohol to industry.

A number of paints, varnishes, dyes, pharmaceuticals, etc., are produced with alcohol. Charles Simons, chief analyst of the British government laboratory, has written:

"Sulphuric acid was formerly said to be an index of national prosperity. Possibly at the present day industrial alcohol is an even better index."

The writer shares these views, and with the rapid development of alcohol for motor fuel purposes he is in favor of a scientific paper like FOOD INDUSTRIES publishing as much scientific data as it can concerning brewing and other fermentation industries.

Most of our knowledge of enzyme chemistry has been developed in brewery laboratories. Pasteur's original research with wine yeast laid the foundation for modern medicinal and industrial biochemistry. Enzyme chemistry is essential in the study of life and metabolic processes; in the pharmaceutical industry; in the preparation of diastatic preparations for the textile industry; in the manufacture of glues, gelatins, dairy products; in the leather industry; also in the fat and food industries. And much of the fundamental research work pertaining to these industries had its origin in the laboratories of distillers and brewers. From these sources much can be learned by other branches of science and industry.

The editor hit the nail on the head when he said in the original article: "Brewing in particular involves control and perfect sanitary technique from which all food industries can learn . . . brewing . . . may . . . stimulate consumption of other food products."

California produced this year 308,000 tons of table grapes, 382,000 tons of wine grapes, and 1,130,000 tons of raisin grapes, which cannot be consumed in food channels but which in the fermentation industries and in the byproduct industries could be profitably utilized. Last year in California there remained about 500,000 tons of various grapes unharvested, which could have been economically utilized in the production of alcohol, glycerin, bakers' yeast, and a large variety of products other than wine.

We are not concerned with prohibition, but for economic reasons and for patriotism we are interested in all industries which will enable us to reduce our agricultural surplus and to provide gainful employment both for the technical and unskilled unemployed, and thus start the wheels of industry moving again on the road to prosperity. Surely from a strictly scientific point of view the accomplishments of the fermentation industries are just as important as any other branch of applied chemistry.

DR. HENRY ARNSTEIN,
Consulting Chemist, Industrial and Efficiency Engineer,
Philadelphia, Pa.

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To the Editor of FOOD INDUSTRIES:

In reply to your continued appeal for an expression of your readers' opinions on technical articles from the alcoholic beverage industry: Yes, I would like to read analyses of their solution of problems which so closely parallel ours in the food industries. I believe every food chemist should be interested in the control methods and sanitary measures which enable them to produce successfully vast amounts of perishable product. We do not need to indorse the purpose of their industry to profit by their experience in bacteriological control. I believe the usable technical knowledge we food chemists could gain by an intensive and unprejudiced study of the alcoholic beverage industry would be well worth our effort.

I. R. STATLER
Chemist
Rome, Ohio

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To the Editor of FOOD INDUSTRIES:

Anent your request for opinions from FOOD INDUSTRIES subscribers respecting desirability of including alcoholic beverages among the articles to be dealt with in the future, permit us to say that we lodge an emphatic "No."

Offhand we should say that the incorporation of articles respecting alcoholic beverages might well enough be construed to imply that the old days of liquor as a free and easy accompaniment of groceries might be returning. We doubt very much if your reading public would relish this suggestion, however desirous some of them might be to purchase a bottle from their own grocery, because education progresses. All matters respecting civilization have been in a gradual process of stepping upward through the years. Opinions differ, acquired habits impede, and progress is slow. It is well enough for wets and drys to argue and put out their propaganda, but all the back and forth arguments, which are so helpful for furnishing news, interest to the public, and filling the newspaper space do not disclose all the quiet and undisclosed feelings of the American public. It is our guess that the public has become sufficiently educated to dislike certain aspects of the liquor business, whatever arbitrary stand they may choose to take upon the subject.

We feel that were alcoholic beverages to be included among the articles with which your publication deals, it might fairly be considered only another step to include many other subjects, more distantly related, and the consideration of which you would decidedly veto.

If liquor becomes again permitted, there will undoubtedly be opportunity for a magazine to appeal to that industry, and which we should say would offer the greatest opportunity for your presses and editors to issue another publication. Such an opportunity for appealing especially to the liquor or beverage industry, or both, would be lost if you started to bunch them all with the manufacturers of food products. Would the brewing and liquor people be satisfied with a "food industry" magazine? We doubt it.

NEW ENGLAND MAPLE SYRUP CO.
C. M. Tice, Manager
Boston, Mass.

* * *

To the Editor of FOOD INDUSTRIES:

We have noted the article written by H. B. Larner entitled "And Still More About Cocoa-Milk," in the "WHAT'S ON YOUR MIND?" column in the September issue of FOOD INDUSTRIES.

This article quotes certain rather vague statements from a prior U. S. patent now expired, and from an ancient French patent which apparently has never had any United States counterpart, to reach the conclusion that "all subsequent patents covering sterilized milk-chocolate drinks, both with and without thickeners, are worthless."

By the same course of reasoning Mr. Larner could arrive at the conclusion that all incandescent lamp patents subsequent to Edison's original patent, and all radio patents subsequent to the patents to Marconi, Fessenden, et al., are worthless. By this reasoning Mr. Larner would doubtless arrive at the conclusion that all improvement patents are worthless.

In view of the fact that hard-headed business men are still spending vast sums of money in procuring and preserving patent protection on their industrial property by means of improvement patents, and in the absence of legal precedent for Mr. Larner's conclusions, we conclude that Mr. Larner is decidedly out of line with the present trend of thought relative to improvement patents.

In brief, it is our judgment that Mr. Larner is in error in his conclusions that "all subsequent patents covering sterilized milk-chocolate drinks, both with and without thickeners, are worthless." The judicial system of the United States has as part of its functions the duty of determining the value of United States letters patent, and some, at least, of the "subsequent patents" will doubtless be adjudicated in the not distant future.

WILKINSON, HUXLEY, BYRON & KNIGHT
By Ralph Munden (signed)

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To the Editor of FOOD INDUSTRIES:

Your Chicago correspondent is quite wrong. Reference to my article will very quickly prove that the conclusion attributed to me is not mine at all but the opinion of H. B. Hunter, president of the H. B. Hunter Co., Norfolk, Va. Mr. Hunter's opinion that all patents pertaining to sterilized cocoa-milk beverages issued since Talansier's patent are worthless is unquestionably based on his careful study of the subject.

My own conclusion was, and still is, that, since the Talansier and Hunter patents have both expired, they are available for public use. Under these patents both men made sterilized cocoa-milk beverages fortified with thickening agents. What they did years ago under the protection of their patents can now be done by anyone, since the patents have expired.

Quoting Mr. Hunter again, it is all "ancient history," so why get excited about it?

HERBERT B. LARNER.

BOOK REVIEWS

JOBS, MACHINES, AND CAPITALISM. By Arthur Dahlberg. Published by the Macmillan Co., 60 Fifth Ave., New York, N. Y., 1932. 252 pp., 5½x8; illustrated; cloth. Price, $3.

WHEN all the shootin's over, this book is likely to rank as the most intelligent study of what is the matter with us evoked by the current depression. The author, trained engineer, economist and sociologist, impartially analyzes the results of a capitalistic economic system and shows why, although this system is the best that offers, things have gone temporarily awry. He also shows how such failures can be prevented in the future.

In the course of his study of the situation, the author found himself handicapped by inability to express in words the complicated interrelationships that exist between the various social and economic factors now working. To get over this difficulty he made a true invention, which is perhaps the greatest contribution of his work. He developed a method for showing the movement and interaction of the major variables encountered, by means of closed circuit diagrams, similar to those used for showing the flow steam, water and other services in a power layout.

The great advantage of this method is that it strips consideration of these factors of the emotional content that is bound to be present when an attempt is made to trace these interrelationships by means of words alone. It provides a fully rational method for showing the combining and coordination of social and economic factors.

By using this method the author is enabled to arrive at the very definite conclusion that the cause of our trouble lies in a glut of labor hours available. He shows how this can be done away with and the results that will follow such action.

The book is stimulating to thought and will do much to set economic thinking right. No engineer, industrialist or business man who wants to have a true understanding of our times can afford to disregard it. G. L. MONTGOMERY.

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BROWNE'S COLD STORAGE TEMPERATURES AND HUMIDITY CHART (second edition, including Part I—Modern, Scientific Cold Storage and Refrigeration). By Milton W. Browne, 3103 Coleman Road, Kansas City, Mo., 1932. 160 pp., 10x13; cloth; illustrated. Price, $10.

DRAWING upon some 30 years' experience and investigation in refrigeration and cold storage, the author, a refrigeration consultant, has been able to visualize the need for practical information and go a long way in meeting it. His book contains generous portions of facts and figures in the form of tables, charts and discussions of problems encountered in the refrigeration, cold storage and freezing of fruits, vegetables, meats and eggs. The work is a guide to storage temperatures, humidities, air circulation rates and safe holding periods for individual products.

The author has based the book upon his contention that the only proper solution to cold-storage problems lies in mechanical refrigeration, humidity control, and air circulation.

Unfortunately, about five pages dealing with the physics of thermometry, air, humidity and heat fall below the average high level of the book. Errors and misstatements have crept in, apparently through careless editing and proof reading. But this detracts little from the main value of the work.

* * *

ESSENTIALS OF ORGANIC AND BIOLOGICAL CHEMISTRY. By E. Wertheim, Professor of Chemistry, University of Arkansas. Published by the Chemical Publishing Co., Easton, Pa., 1931. 175 pp., 6½x9¼; cloth. Price, $2.50.

IN THE preparation of this textbook for use in the classroom, the author has brought together much information that will be of interest and value to ambitious workers in food production who have been denied a formal chemical training.

For those who have a desire to be informed on the generic chemical composition and characteristics of organic groups, structural formulas and equations are included in the text material. Of more importance to food workers are the chapters on proteins, enzymes, digestion and absorption of foods, metabolism, quantitative nutrition, dietary necessities, and foods and beverages.

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BIBLIOGRAPHICAL SURVEY OF VITAMINS, 1650-1930. By Mark H. Wodlinger. Published by Mark H. Wodlinger, 86 East Randolph St., Chicago, Ill., 1932. 334 pp., 6¼x10¼; cloth. Price, $10.

VITAMINS are regarded as a twentieth century discovery in nutrition, yet Miss Ella M. Salmonsen, medical reference librarian, the John Crerar Library, compiler of this bibliography, finds specific reference to rickets in English literature of 1650.

It is significant that an increasing number of references to vitamins are found in world literature between that date and 1916. In the latter year these food accessories became sufficiently identified to justify a classification of literature under subheads of Vitamins A, B, C, and General Vitamin References. For subsequent years further classification is made under subheads Vitamin D and Vitamin E.

The approximate 12,000 references to world literature in this compilation are chronologically listed in alphabetical order, according to the major author. The authors' names are in bold-faced type and the titles of the references are quite full and in easily read light-faced type. Any searcher of literature greatly appreciates such devices, which reduce his labor to the minimum.

From 1916 to 1930, vitamin literature is quite voluminous and references to literature of that period comprise more than 94 per cent of this bibliography. A bibliography for the years 1931 and 1932 is in the course of preparation, to be published early in 1933.

With these aids, any technologist or research worker engaged in food work has little reason to be ignorant of what has appeared in literature regarding vitamins.

The last 12 pages are devoted to 240 patents pertaining to vitamins. These patents are listed alphabetically, according to name of patentee. Title and number are included.

* * *

DAIRY BACTERIOLOGY. By Orla-Jensen, Professor of Technical Biochemistry, Royal Technical College, Copenhagen, Denmark. Second Edition. Published by P. Blakiston's Son & Co., Inc., 1012 Walnut St., Philadelphia, Pa., 1931. 198 pp., 9¾x6¼; 67 ilustrations; cloth. Price, 4.50.

ALTHOUGH latest developments in practice and equipment are utilized in the dairy industry, the reasons for and the results obtained by following given directions are not well known to the personnel of the industry. To make this information available, the author has put into textbook form details from his thirty-five years' experience in dairy research work and teaching of dairy practice.

Included are only those phases of bacteriology that have direct bearing on dairy practice and only those phases of dairy practice that are of bacteriological interest. To the English-speaking technician in dairy work who has some familiarity with bacteriological technique, this translation by Paul Arup will be highly valuable.

In the first section, composed of three chapters, a general discussion of bacteria, yeasts and molds commonly found in milk prepares the reader for the second part, consisting of eight chapters dealing with their relation to production, handling and processing of milk, butter and cheeses. Various types and species of daily microorganisms are described and illustrated by miscroscopic photographs and defective, as well as normal, effects of these organisms on dairy products are emphasized.

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Books Received

CHEMISTRY OF FOOD AND NUTRITION. By Henry C. Sherman. The Macmillan Co., 60 Fifth Ave., New York, N. Y. $3.

COMMON SENSE APPLIED TO MOTION AND TIME STUDY. By Allen H. Mogensen. McGraw-Hill Book Co., 330 West 42d St., New York, N. Y. $2.50.

FRUIT AND VEGETABLE PRODUCTION FOR COMMERCIAL CANNING. Bulletin No. 45. British Library of Information, 270 Madison Ave., New York, N. Y. 35 cents.

MICROBIOLOGY OF FOODS. By Fred Wilbur Tanner. Twin City Printing Co., Champaign, Ill. $7.50.

REVIEW OF WORLD PRODUCTION, 1925-1931. World Peace Foundation, 40 Mount Vernon St., Boston, Mass. $1.25.

WORLD ECONOMIC SURVEY, 1931-52. World Peace Foundation, 40 Mount Vernon St., Boston, Mass. $2.50.

WORLD SOCIAL ECONOMIC PLANNING, with Addendum. International Industrial Relations Institute, 130 East 22d St., New York, N. Y. $2.50.

Men, Jobs and Companies

INDUSTRY

ARBUCKLE BROS. has reacquired complete control of merchandising and sale of Yuban Coffee, taking it back from Grocery Store Products, Inc. No change in merchandising policy is contemplated.

CANADA RICE MILLS' new plant on deepwater Lulu Island, near Vancouver, has a capacity of 24,000 tons yearly.

FINE FOODS OF CANADA, LTD., will manufacture, in its Tecumseh plant, Gerber's strained vegetables and strained cereal in whole fresh milk for Canadian and British markets. Production of some varieties is scheduled to begin this month. Fremont Canning Co., Fremont, Mich., of which Gerber Products Co. is a division, invested $75,000 in the Tecumseh plant, acquiring minority stock interest.

FROSTED FOOD SALES CO., General Foods subsidiary, now operates 400 stores and expects to bring the total number to 700 by March. This development is taking place in New England and Middle Atlantic states. The company is also taking definite steps in "selling" hotels, restaurants and steamships on quick-frozen foods.

GENERAL BAKING CO. enjoyed further strengthening of its rights to exclusive use of its green bread wrapper when Hynes Baking Co. agreed to adopt a yellow wrapper. This arrangement halted court action instigated by General Baking to prevent Hynes from employing a green wrapper alleged to resemble closely that of the plaintiff.

GENERAL MILLS, INC., petitioned for an injunction against use of the trademark "Quick-Bis-Kit" by Commander-Larabee Corp., charging infringement of its "Bisquick" copyright. But Federal Circuit Court of Appeals denied the petition.

LIBERTY BREWING CORP. has been organized with authorized capital of 1,000,000 shares, $1 par value, to take over Pittston Beverage Co., Pittston, Pa., recently appraised at $665,000. The brewery plans to produce wort at present, but its real purpose is for making Glennon beer, the original product of the plant, when and if, Congress modifies the dry law.

LOFT, INC., plans a $200,000 candy plant at Detroit, according to Economical-Cunningham Drug Stores, Inc., which will have exclusive distribution of Loft products in the Detroit area. This development, expected to involve business amounting to $2,000,000 for the intital year, marks Loft's first step into the Middle West.

MINNESOTA VALLEY CANNING CO., Lesuer, Minn., is seeking federal injunction against Reid, Murdock & Co. for employing the term Golden Maize Corn. The Minnesota Valley company holds that this label conflicts with its Del Maiz trademark.

PACKAGING MACHINERY MANUFACTURERS held their first meeting Oct. 6-7 at Shawnee-on-the-Delaware, the purpose of the conference being to discuss the industry's problems and promote closer relationship among its members.

J. R. SHORT MILLING CO., Chicago, has taken over Doughnut Equipment Corp., doughnut flour manufacturer. The Short company will sell the flour direct to bakers.

UNITED GRAPE PRODUCTS, INC., Buffalo, N. Y., including six grape juice plants in New York and Michigan, with all their machinery and other assets, was sold Oct. 10 to a committee of the company's creditors for $88,100 by the U. S. District Court.

WILLIAMSON CANDY CO. is introducing to the market a peanut butter containing vitamin D produced by the Pacini process. It is said to contain 250 units of the vitamin in each pound.

PERSONNEL

C. G. HARREL resigned as head of the laboratory staff of Commander-Larabee Corp., Minneapolis, Oct. 15, and took a

position with Pillsbury Flour Mills Co., Nov. 1, as director of products control and bakery research. He succeeds M. A. GRAY, who will devote his time to sales activities.

M. HULL, who has charge of pecan improvement work at Louisiana State University, where he is assistant horticulturist, was elected president of the National Pecan Association at its 31st annual convention at New Orleans, Sept. 29. Other officers chosen were J. SLATER WIGHT, Cairo, Ga., first vice-president; and J. LLOYD ABBOT, Springfield, Ala., secretary-treasurer.

LORD INVERFORTH, chairman of Thomas J. Lipton, Inc., and of other Anglo-American concerns, arrived in New York Oct. 17 to investigate business conditions. As for business abroad, it has made a slight improvement, Lord Inverforth said.

THOMAS H. MCINNERY, president of National Dairy Products Corp., New York, N. Y., has accepted chairmanship of the food division of the Emergency Unemployment Relief Committee and will assist in raising funds for relief of the unemployed in New York this winter. Funds will be solicited from employers, employees and employee associations in an attempt to alleviate the desperate situation faced by multitudes of idle.

FRED MASSMAN, vice-president of National Tea Co., was recently elected president of the National Chain Store Association to succeed ALBERT MORRILL, of the Kroger chain. ROBERT LYONS was renamed executive secretary and A. W. HUGHES was made treasurer.

FRANK W. MEYER, special representative of Standard Brands, Inc., New York, N. Y., has spent almost a half century with the Fleischmann's Yeast organization, Standard Brands subsidiary, celebrating his 45th anniversary with the concern Oct. 13. On a Friday the 13th, way back in 1887, he took a job with Fleischmann's as a wagon driver.

J. J. MULLIGAN, who has served the food industry well for many years as editor of *The Canner*, recently resigned his position with the Chicago publication. He is succeeded by D. M. HUBBARD.

COL. T. H. MURPHY, Yonkers, N. Y., has returned from El Salvadore, Central America, where he has been administrator general for the Melendez interests for the past year, being in charge of plantations, sugar mills and alcohol manufacture. Colonel Murphy was technical superintendent for the Spreckels Sugar Corp. before it ceased operations.

J. A. PAULHUS, of the D. Hatton Co., Montreal, has been made president of the Canadian Fisheries Association, the election being held at the Quebec convention of the organization.

DEATHS

IRVIN CADMUS, one of the founders of United Fruit Co., died at his home in East Orange, N. J., Oct. 19 after a long illness. Mr. Cadmus, who was 78 years of age, withdrew from active business life ten years ago when he was manager of the New York division of United Fruit.

JOHN GLASS, Buffalo, N. Y., known as world's champion beef dresser, died Oct. 12 after being ill a short time. He was 56. Mr. Glass, who was head of a wholesale meat company at the time of his death, gained his championship title in 1905, at Buffalo, when he defeated contestants from all parts of the country by killing and dressing a steer in 4 minutes and 48 seconds. His best time in preparing a steer was 2 minutes and 56 seconds.

FRANKLIN J. HECKLER, manager of Whitman & Co., candy manufacturers, died in Philadelphia Oct. 20 of heart disease. The 62-year-old executive entered the candy industry 20 years ago as an associate of E. G. Whitman, his father-in-law.

WILLIAM P. MARSH, secretary and treasurer of Borden's Farm Products Co., Inc., New York, N. Y., and an official of the company for fifteen years, died Oct. 5 of heart disease at Borden's Madison Ave. office. Mr. Marsh, who was 55 years old, entered the employ of the dairy concern in 1902 as a stenographer.

A. W. MEYER, chief chemist for W. E Long Co., Chicago, and chairman of the Mid-West section of the American Association of Cereal Chemists, was drowned in Lake Michigan recently when his speedboat crashed into a breakwater off downtown Chicago.

THIS MONTH—

NOVEMBER

1-4—National Association of Practical Refrigerating Engineers, with exhibit, Hotel Sherman, Chicago, Ill.

2-3—National Creamery Buttermakers' Association, Mason City, Iowa.

10—National Malt Products Manufacturers' Association, quarterly meeting, Hotel Pennsylvania, New York, N. Y.

14-15—Institute of American Meat Packers, Drake Hotel, Chicago, Ill. Departmental meetings will be held Nov. 11-12.

14-18—American Bottlers of Carbonated Beverages, annual meeting and international exposition, Cleveland Public Auditorium, Cleveland, Ohio.

15-18—National Association of Ice Industries, with exhibition, William Penn Hotel, Pittsburgh, Pa.

29—American Association of Creamery Butter Manufacturers, Palmer House, Chicago, Ill.

Hors d'Oeuvres

AS A MATTER of keeping peace in the family where tastes for bread don't agree, manufacturers have introduced a "two-tone" loaf that alternates a white slice with a dark brown whole-wheat slice. The loaf also effects economy.

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PRETTY soon about the only cost attached to vinegar will be the container. It can now be made for less than six cents a gallon. This has been made possible by a new process that produces it from alcohol by a catalyst rather than by the usual vinegar generator.

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WHO SAID that people hardened to the use of hard liquor would never go back to beer? Beer consumption in Finland increased 140 per cent in September and the demand for hard drinks fell off sharply. And beer drinking usually subsides in September.

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ENGINEERS and scientists have had a lot of time to dream since 1929, so look out for a flood of new contrivances. One we have in mind is a can for foods that may be lighted to heat its contents.

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NATIVES of the Virgin Islands have fly-sense. It is the practice of many of them to buy fish that flies are buzzing around, acting on the theory that flies always choose the best meat.

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A TRADITIONAL transoceanic race of 32 years standing has been discarded. The first cargo of new crop Persian dates to reach the Port of New York this fall was carried by a ship that raced against nothing but time, rival shippers having called off hostilities.

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THERE SEEMS to be no limit to the wonders of science. A factory in Jamaica is going to manufacture shoe soles, among other things, from banana waste, it is reported. More than likely the soles will be labeled "non-skid."

What Food Men Are D

Dairy Exposition Success—Seek Farm Bon
Coffee Situation—Two Strikes Coll
Clause—Potato Storage —N

DAIRY and ice cream manufacturers were in a healthy frame of mind at the Dairy Industries Exposition held in Detroit the week of Oct. 17. They turned out 12,000 strong, an attendance only slightly under that at the record breaking expositions of 1930 and 1931. More than 225 exhibitors displayed their equipment and supplies, and they did some business.

Problems of the industry were treated in a multitude of papers. Among these, the talk of Dr. H. A. Ross, dairy economist of The Borden Co. was significant. Dr. Ross pointed out that the production of milk will probably continue to increase until January, 1934.

Another high-light of the convention was a symposium of three papers on the subject of paper cans in the ice cream industry. This told how a saving of 3.4 cents per gallon effected in a small company by the use of the paper containers. Of this, 3.2 cents represented difference in delivery cost and 0.2 cent manufacturing economy. Despite the multitude of apparent advantages for the paper can, few ice cream companies are using it.

Other particularly interesting meetings were those devoted to the discussion of the ice cream bootlegger, the double-dip cone, chocolate-covered ice cream on a stick, and the low-priced package. All these merchandising problems have grown out of the fact that an abundant supply of low-priced raw materials makes it possible for "fly-by-night" manufacturers to get into business easily and produce cheap products.

LEGISLATIVE fireworks of import to food manufacturers, farmers and every mortal that eats processed food commodities apparently are in store for Congress at its next session. For it seems certain that there will be introduced a measure proposing to provide a bounty for the distressed farmer through an internal tariff on the manufacturer or distributor of agricultural products.

The bill, sponsored by Senator Norbeck, North Dakota, is known as an amendment to the Agricultural Marketing Act. It encompasses the entire gamut of agricultural products and would be applicable to any commodity, provided 60 per cent of the producers of that commodity voted to avail themselves of the privilege of the act and restricted their production, as prescribed by the Farm Board, in order to hold crops and livestock to foreign and domestic demand and prevent overproduction. The producer's restriction would not be more than 10 per cent in any one year.

An idea of the amount of the levy on individual commodities may be gained from the fact that the proposed tax on wheat is 42 cents a bushel, or $2 a barrel of flour and 1 cent per loaf of bread.

The chance of such a measure being passed is conceded to be enhanced by campaign promises of relief legislation for the farmer.

TRINIDAD'S cocoa industry may be doomed. Witchbroom disease has spread over 122,568 acres and has infected fully 50 per cent of the cocoa trees. This total shows a large increase when compared to that for the early part of the year, despite an energetic attempt to control the disease. Government authorities say that unless an increase in prices provides larger sums with which to combat the scourge, the industry may be wiped out.

BRAZIL'S civil war came to a close early in October and the great coffee port of Santos is no longer blockaded. However, shipment of coffee from the port will be impeded until an investigating committee from the national government and the national coffee growers' headquarters has made a study of the coffee situation there. Despite that restriction, it is expected that the Grain Stabilization Corp. will find it unnecessary to ask for permission to sell more than the 62,500 bags a month stipulated in the wheat-coffee barter deal.

During the three months of the civil war, imports of Brazilian coffees were 900,000 bags below last year, but deliveries were only 275,000 bags lower. While the port of Santos was closed, deliveries for consumption of milds showed an increase of 400,000 bags over last year, which demonstrates that the relative position of Brazilian coffees was impaired.

CABBAGE strikers, the most recent addition to the long list of protesting food producers, have given up the ghost, according to recent advices. These growers are located in the Finger Lakes district of New York, the state that has produced 44 per cent of the total United States commercial crop for the past four years. The trouble started when the producers who sell to the open market rather than for contract prices decided not to sell and to prevent others from selling. They came to this conclusion when open market prices fell to $2 a ton, or $3 less than was called for in kraut plant contracts. The low prices resulted from a high yield per acre that made the crop in New York and in Wisconsin, the other key state, about 45 per cent greater than in 1931.

Doing and Saying

Bonus—Trinidad's Cocoa Ravaged—Collapse—Adopt Protective —New Zealand Mutton

The late crop of Danish cabbage is placed at 321,500 tons, compared to 261,300 tons last year and an average of 270,175 tons for the four-year period 1928-31.

Peanut growers in Georgia also instigated a strike, but they didn't hold out for long.

SALES TAX levies are becoming so popular with the federal and with state governments that it seems advisable to make some provision to protect manufacturers. Accordingly, the Canners' League of California and the Dried Fruit Association have adopted a protective clause for immediate use on domestic contracts, brokers' sales memoranda and the like. The clause reads as follows: "In addition to the price stated herein, buyer agrees to pay, or to reimburse seller for, any sales tax or taxes which may be imposed by the federal and/or state governments, or the price herein stated shall be increased to the extent of such tax."

POTATOES are not being stored properly, according to findings of Cornell University experiment station. Three years of tests have shown that nearly half the losses by rots and much of the water loss are obviated by keeping the temperature at about 65 deg. F. for the first ten days in storage, but the customary practice is to hold the temperature at 40 deg. F.

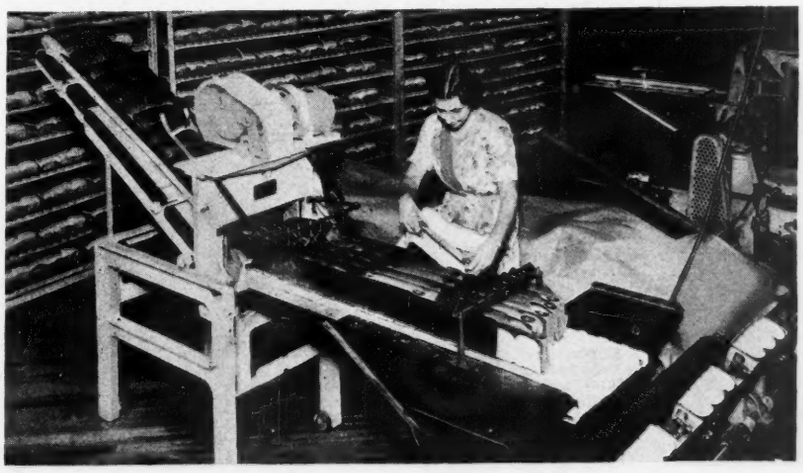
The reason for the reduction in losses at the higher initial temperature lies in the fact that the thickening and toughening of the skin is hastened. As the greatest losses in weight of stored potatoes are due to losses of water, the thickened skin reduces this loss early in the season. After the first few days of warm temperatures, the usual cool temperatures should be maintained.

FROZEN LAMB and mutton shipped from New Zealand and sold in Great Britain have been a source of worry to the British Department of Scientific and Industrial Research. This produce has suffered from loss of bloom and consequent depreciation in value of from a halfpenny to a penny a pound.

In summarizing its findings, a committee of British experts from the department states that extreme conditions of high temperature and low relative humidity resulted both in excessive loss of weight and in deterioration in appearance of the carcass. Particular stress was placed upon improvement in rail transport to prevent sweating and distortion of the carcasses by keeping the temperatures in the cars low. In regard to transportation in vans, the report states that carcasses from the upper layers in the vans were relatively soft. And it pointed out that when the vans were exposed to the sun for long periods, the temperature of the meat reached relatively high levels.

The average loss of weight during cooling, freezing, 28 days' storage in New Zealand, ocean transport and 28 days' storage in Great Britain was found to be 3.65 per cent.

A new 5-cent package of bread has been introduced by Papendick Bakery Co., St. Louis. It contains twelve slices and is wrapped in transparent cellulose. Slices are cut from a triple loaf large enough for five packages. This machine automatically divides the bread into nickel portions



—AND THE NEXT

DECEMBER

2—National Dairy Association, annual meeting, Palmer House, Chicago, Ill.

7-9—American Institute of Chemical Engineers, Hotel Washington, Washington, D. C.

7-9—American Society of Refrigerating Engineers, annual meeting, Hotel New Yorker, New York, N. Y.

28-30—The Society of American Bacteriologists, annual meeting, Michigan Union Building, University of Michigan, Ann Arbor, Mich.

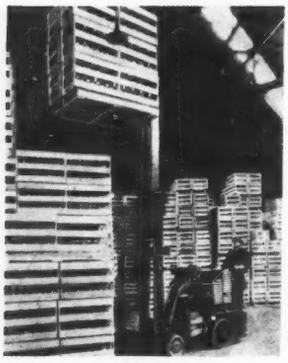
—Middle Atlantic Fisheries Association, annual meeting, J. H. Matthews, secretary, 203 Front St., New York, N. Y.

Loss leader merchandising, like free deals and high tariffs, is a good thing only as long as only one concern or one country is doing it.

Concentrates

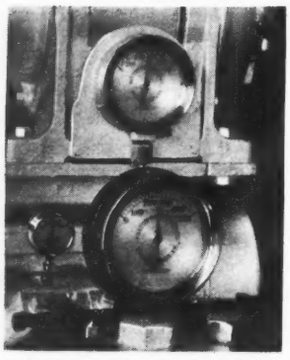
"The great need of the food industry is not so much for good advertising as for capable, high-minded, socially responsible advertising artists, experts in the trade," states the American Medical Association in connection with its efforts to curb false advertising claims . . . Addition of water to canned foods labeled "Solid Pack" constitutes adulteration, the Department of Agriculture announces . . . Government experiments are reported to prove that slow-freezing at ordinary temperatures is to be preferred for some fruits, but certain leaders in commercial fruit freezing hold temperatures from —35 to —50 deg. F. give best results . . . W. H. Henderson, Fresno, Calif., has developed a seedless muscat grape which he hopes to introduce within a year . . . A beet that is highly resistant to the curly top disease has been developed by the Department of Agriculture, and a comprehensive program of seed production is under way . . . The soybean promises to become America's most versatile crop, according to the government, which has collected nearly 400 soybean products from America and the Orient . . . Testing cranberries in "incubators" has proved a reliable method of forecasting their keeping quality for the season in Massachusetts . . . British and other European nations are making more rapid progress in cleaning wheat than American millers, according to speakers at a meeting of Operative Millers' Association in Buffalo . . . Thomas D. Campbell, Hardin, Mont., has declared his intention of seeding a large part of the area which he leases from the government on the Crow Indian Reservation. He is famous as the world's largest wheat farmer . . . Canada will have to import about 5,000,000 lb. of butter this winter, unless her production is increased very materially . . . Systems of export bounties for hogs have been inaugurated in the Irish Free State and the Netherlands . . . Standard package foods are moving only slightly slower than a year ago, reflecting established popularity.

NEW EQUIPMENT FOR



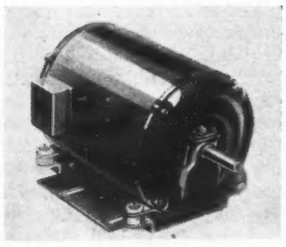
Truck Stacks Material 25 ft. High

Telescoping uprights that will stack material as high as 25 ft. are provided on a materials-handling truck manufactured by Ewell-Parker Electric Co., Cleveland, Ohio. By virtue of this equipment, storage space is said to be increased from 100 to 300 per cent without increase in floor area, since all available headroom is utilized. Despite its high lift, this truck can enter places with low headroom, such as freight cars, and it can pass under balconies and low pipes.



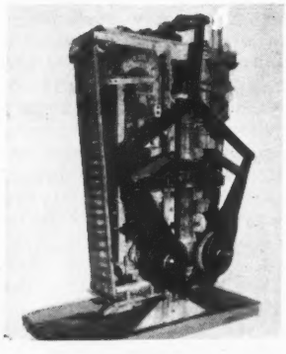
Gage Doesn't Corrode Nor Vibrate

Vibration and corrosion have been eliminated in a hydraulic pressure indicator developed by Manton-Gaulin Manufacturing Co., St. Johnsbury, Vt., for use on homogenizers and pumps where there is excessive vibration or a corrosive product. The gage is of the Bourdon tube type, and it is equipped with an Alemite fitting through which its tube is filled with a non-corrosive fluid. The fluid flows through a tube connecting the gage with a cylinder fitted in the pump. This cylinder is equipped with a plunger that transmits the pressure from the pump to the fluid in the connecting tube and thence to the gage.



Built-In Capacitance

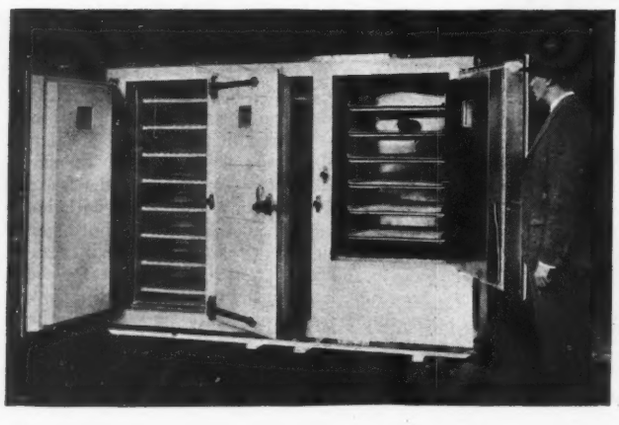
Built-in fractional-horsepower capacitor motors that eliminate the capacitor box outside the motor and assume a conventional appearance have been developed by Howell Electric Motors Co., Howell, Mich. This line of motors is designed for 110-volt, single-phase, 60-cycle operation and a full-load speed of 1,735 r.p.m. The starting torque ranges from 465 per cent of full-load torque for the ½-hp. size to 330 per cent for the ¾-hp. unit.

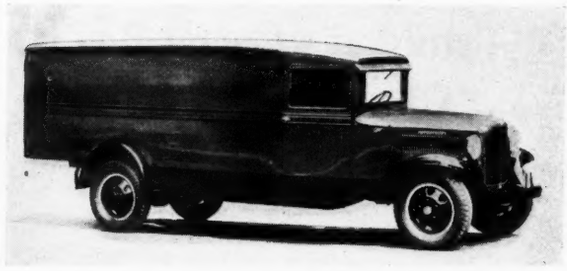


Fabric Filter Press

What is claimed to be the only successful type of continuous filter press developed has been perfected by Robert M. Thompson, 7321 Eighth Ave. So., Seattle, Wash. In this machine, a filter-tight chamber is formed by two pairs of continuous belts—metallic end belts supported by adjustable spring - supported tracks and filter fabric belts supported by liquid collecting slats. The slats, which are bolted to two endless, sprocket-driven chains, are supported by adjustable springs.

Material is pumped into the chamber through an opening in the top of pressure expanding plugs. As it moves downward toward the point where the cake is discharged the pressure increases up to 500 lb. per sq.in., or more; filtrate is drawn off at various points. By inserting a plug at the top, the machine may be changed from a continuous filter press to a continuous press. Continuous separation through fabric and intermittent pressure are among advantages listed.





Metal-Faced Panels

Structural panels combining the heat and sound insulating properties of fibrous materials with the high strength, superior surface and fire-resisting qualities of metal sheets are being manufactured by Truscon Steel Co., Youngstown, Ohio. The panels comprise a metal facing cemented to one or both sides of a sheet of core material.

"Z Process" Of Quick-Freezing

Foods are quick-chilled or quick-frozen in a fog of atomized brine by the "Z Process." This method, developed in Europe by M. T. Zarotschenzeff and introduced into this country about a year ago, has been under test by Frick Co., Waynesboro, Pa., which has exclusive manufacturing and sales rights in this part of the world. It is said to effect freezing in an unusually brief period.

Two types of freezers have been built: periodic and continuous. In the former, shown in the illustration, a centrifugal pump draws cold brine from the bottom of a tank and delivers it through a strainer to atomizer nozzles which distribute it throughout the freezer. A 4x4 Type HA combined refrigerating machine is connected to the cabinet at the rear. Direct expansion is employed for both freezer and storage coils. For continuous freezing, a cabinet is equipped with a spring wire mesh conveyor belt that moves through the brine fog in the lower half of the cabinet, the upper half being used for storage space.

The brine is held at 5 deg. F., or higher, and in general, freezing time is 30 minutes for each inch of thickness of the product when directly exposed to the fog. Shrimp in single layers (bare) are frozen solid in 8 minutes. The fog keeps the relative humidity of the freezer at or near 100 per cent, and meats frozen by the process generally gain a fraction of one per cent in weight, it is asserted.

Small Truck With Famous Engine

Formerly available only in two- to three-ton trucks, the 6-cylinder Gold Crown engine is now offered by Reo Motor Co., Lansing, Mich., in a 1½-ton, low-cost Speed Wagon. This engine develops 68 brake horsepower at 2,800 r.p.m. and generates in excess of 152 ft.-lb. of torque through the wide range of 1,000 to 2,000 r.p.m. It has chrome-nickel cylinder blocks, full-force-feed oiling system, and main crankshaft bearings and piston pins of large area. Loading space extends 102 in. behind the cab on the 140-in. wheelbase models and 126 in. on the 164-in. models.

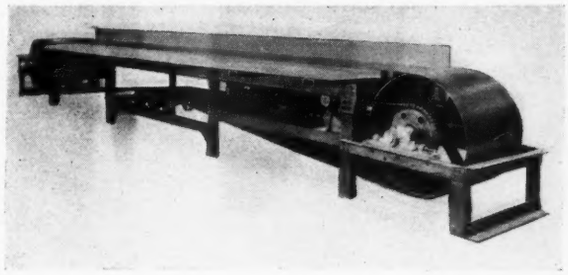
The Reo company has introduced an "ability" system of rating its vehicles. A 1½-ton truck, for example, will bear a plate inscribed with "8500-4½-51." The 8,500 is maximum load; the 4½, grade the loaded truck will climb in high gear; the 51, speed of loaded truck on average level road.

Instrument Clocks Idle Time

Accurate check on machine performance and operator efficiency is obtained by a machine marketed by Graybar Electric Co., Inc. Known as the Chronolog, this device counts the pieces produced by a machine, measures the time the machine is idle and records that information, together with reasons for shutdowns, on a chart. Visible indicators show clock time, accumulated idle minutes, productive minutes and count of pieces.

When an interruption in production occurs, the operator turns a dial on the instrument to the code letter representing the cause. A typical installation would have a dial with the following letters: *P*, for production; *A*, personal; *B*, down for stock; *C*, inspection; *D*, cleaning machine; *E*, tool grinding; *F*, machine repair; *G*, no job; *H*, busy on other machine; *S*, set-up. Substantial increase in production is claimed for machines on which the Chronolog is installed.

FOOD MANUFACTURERS



Steel Conveyors

Conveyor belting made of high-carbon steel, cold-rolled, hardened and tempered, is marketed by Sandvik Conveyor Manufacturing Co., 21-23 Amsterdam St., Newark, N. J. It comes in one-piece lengths of 250 to 300 ft. and the lengths may be joined either end to end or side by side. It is especially adapted to conveying operations where high temperatures are involved, or where a hard, smooth sanitary surface is required. The material is corrosion-resisting to a certain extent.

Hermetically Sealed Cartons

Protection against air, moisture and grease penetration is claimed for a paperboard container perfected by Interstate Folding Box Co., Middletown, Ohio. The material used is boxboard treated with a coating of cellulose acetate and provided with an asphalt filler. If protection against air and grease only is desired, the filler is not used. When these cartons have been filled and sealed, the edges are "welded."

THE MANUFACTURERS OFFER

Paint—A folder leaflet by the Ruberoid Co., 95 Madison Ave., New York, N. Y., presents pictorially eight applications of its acid-resisting asphalt paint and describes the properties of the product.

Wire Cloth—A 104-page catalog on wire cloth is announced by Newark Wire Cloth Co., Newark, N. J. This publication is of the nature of a handbook. It illustrates and lists all types of wire cloth, gives tables and list prices of the material, describes some of the different types, gives a glossary of wire-cloth terms, and contains some handy conversion tables. The publication is attractively bound and is of pocket size.

Circuit Breakers — "Nofuze" load centers, panelboards and switchboards, meter services, and commercial and industrial type circuit breakers, all of which operate on the De-ion principle of arc extinction, are described in a well-illustrated, 76-page booklet of Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. Prices are listed.

Ice-Making Equipment—In a 20-page, illustrated, pocket-size bulletin, Frick Co., Waynesboro, Pa., presents its fittings for raw-water ice-making systems.

Candies—Sixteen pages of recipes for milk-made candies comprise the content of a bulletin by Evaporated Milk Association, 263 North Wabash Ave., Chicago, Ill.

Candy-Plant Equipment — A folder leaflet by White Star Equipment Corp., 18 East 12th St., New York, N. Y., illustrates and briefly describes 21 different pieces of equipment for the candy manufacturer.

Unit Air Washer—A brief description of and a rating table for the unit washer of the Buffalo Forge Co., Buffalo, N. Y., are presented in a 4-page illustrated bulletin of the company. A similar bulletin describes the company's unit coolers.

Pump and Compressor—Conical-type Hyter vacuum pump and compressor are illustrated and described and performance curves and data are given in a 12-page bulletin by the Nash Engineering Co., South Norwalk, Conn.

Processing Vessels—A 12-page, loose-leaf booklet of Bethlehem Foundry & Machine Co., Bethlehem, Pa., gives the thermal and construction features of processing equipment made by the company.

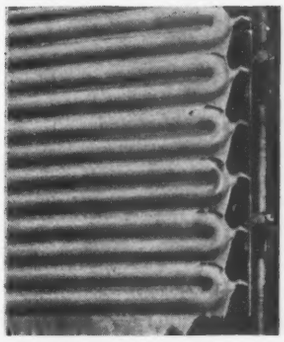
Wrapping Machine—The special mechanical features of the universal wrapping machine manufactured by Lauenstein & Co., a German concern, are treated in a folder leaflet of the company. J. M. Lehmann Co., Inc., 243 West Broadway, New York, N. Y., is the American and Canadian agent.

Refrigerant—A 56-page booklet entitled "Arctic—The Refrigerant," by Roessler & Hasslacher Chemical Co., Inc., New York, N. Y., contains information on the physical, physiological and thermal properties of the company's methyl chloride refrigerant. Performance data, uses, and methods of handling and servicing are given.

Paper Bags — Three folder leaflets discussing the value of sanitation in handling flour and presenting the advantages of the multi-wall paper bags manufactured by Bates Valve Bag Co., Ltd., 129 Rebecca St., Hamilton, Ont., are offered.

Lift and Traction Trucks—Gasoline-powered trucks with lifting and materials-handling attachments and trucks for pulling heavy loads about the shop are described respectively in 36-page and 16-page booklets by Clark Tructractor Co., Battle Creek, Mich.

Transparent Wrappings — A report on the experience of 29 companies in the use of transparent wrappings as a sales aid for food products has been prepared by Metropolitan Life Insurance Co., New York, N. Y.

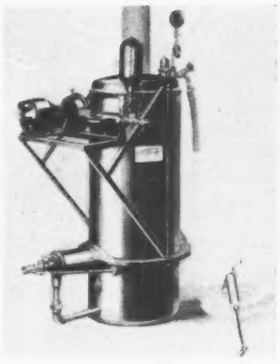


Surface Cooler

With the chrome-nickel alloy surface cooler manufactured by York Ice Machinery Corp., York, Pa., the entire tube and return surfaces are available for cooling. Integral with the tubes are drip strips; the entire assembly is welded and polished. The returns, with the support lugs and deflectors, are die-pressed. These units are applicable for use with water, brine or ammonia.

Control Instrument With Commutator

Commutator type contacts have been incorporated in the design of an electrically operated control instrument, Rotax Electric Controller, made by Foxboro Co., Foxboro, Mass. More accurate control, uninterrupted pen travel, positive contact at all times with minimum of arcing, and means for setting from outside the case are advantages claimed for the controller. The instrument is used to control temperature, pressure, humidity and liquid level, and to give visual or audible signals.



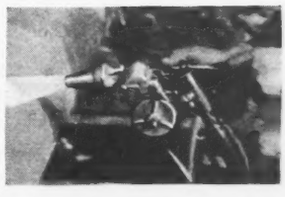
Cleaner Employs Four Elements

Four cleaning elements—heat, friction, soap and water—are employed in combination by an automotive and industrial cleaning unit, Kerrick Kleaner, made by Chemical Process Co., Los Angeles, Calif. The cleaner is said to be effective in removing heavy deposits of dirt and grease and in sterilizing, disinfecting and deodorizing equipment in food plants.

In operation, a ½-hp. reciprocating pump delivers a solution of soap and water from a mixing tank to the top of a continuous coil at the rate of 1 gal. a minute. The solution is heated in the coil, and it expands and develops pressure. As it discharges through the outlet nozzle, it atomizes to form a fine, harmless spray. The supply of fuel—hence the heat and pressure in the coil—is controlled by a thermostatic regulator. Average cost of operation is placed at 24 cents per hour.

Bag Fasteners

By slight variation in design, the stapler manufactured by Bates Manufacturing Co., Orange, N. J., has been made into a bag fastener. There are two models, one for bulky packages with contents up to 6 in. in diameter and one for bags of special size and shape. Both make their own staples from a spool of rustproof wire with material enough for 5,000. Foot-power attachments are available.



Gun for Spraying Metal

Practical and economical commercial operation is claimed for a gun perfected by Metal Spray Co. and marketed by De Laval Pacific Co., 61 Beale St., San Francisco, Calif. This gun is a hand tool having an air turbine which drives, through reduction gears, two knurled wheels that feed metal wires or rods into an oxyacetylene flame. An air blast atomizes the molten metal and impacts it against the surface to be sprayed, this surface having been sandblasted.

The gun is made in three sizes, the large size handling $\frac{3}{16}$-in. soft metal wire, and the other two, respectively, 12 gage B & S and $\frac{1}{8}$-in. wires in all metals. All operate at from 10 to 20 lb. acetylene pressure, 15 to 25 lb. oxygen pressure and 90 lb. air pressure. Large capacity and consequent lower costs are attributed to Metalspray guns.

BUSINESS TRENDS

Bureau Makes Tax Rulings Affecting Food Trade

At least one class of beverages will escape the manufacturers' sales tax. The Internal Revenue Bureau has ruled that non-alcoholic imitations of famous pre-prohibition drinks are not subject to the tax on soft drinks, since they are not "unfermented fruit juices or finished fountain syrups within the meaning of the Revenue Act of 1932." Among the exempt beverages are grenadine, almond syrup, benedictine, chartreuse, vermouth, Manhattan cocktails, Martini cocktails, crème d'apricot, kümmel, London dry and crème de cerise.

Also exempt are refrigerator parts or units for commercial purposes. Included in this category are ice cream cabinets and refrigerator units for commercial transportation equipment.

Decisions on the taxability of electrical energy hold that energy furnished to branch houses owned and operated by meat-packing establishments for processing meat products is not subject to tax. But energy for refrigerating, storing and aging meats or for distributing the products is taxable. Likewise, energy used in cleaning, drying, grinding and bleaching grain is exempt, while that consumed in handling grain stored for resale or for a producer is taxable. Where electrical energy for both taxable and non-taxable uses, in either the packing house or the grain elevator, is metered by the same instrument, the predominant character of the business determines the classification for taxation.

Manufacturers who add a fair specific charge for advertising or service guarantee in billing to a distributor or dealer may exclude these charges from the selling price upon which the tax is based.

Business Hesitates

Economists insist that fundamental economic factors show a continued convalescence from our second-quarter economic crisis. Also payrolls, employment and electric power consumption in all industries continued their definite upturn during September. Yet business improvement in October has come to a standstill, senseless though it may be, awaiting the results of the coming election. This activity, as indicated by *The Business Week* index, hovers around 55.0 per cent of normal for the week ending Oct. 15, where it has been for the past month.

Wholesale prices of all commodities, reported by the U. S. Department of Labor, have decreased 1.53 per cent during the period Sept. 17 to Oct. 15. Food prices declined 2.25 per cent. A weighted index shows the decline to be 1.85 per cent in the price of all commodities and 2.54 per cent in foods for the period Sept. 24 to Oct. 22.

In spite of people's returning from vacations and the approach of cooler weather, A. & P. tonnage sales for September were 20.12 per cent lower than for August. Its volume of business for September, 1932, is 4.05 per cent below that for September, 1931.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Certain Foods Show Rise In Quantity Exported

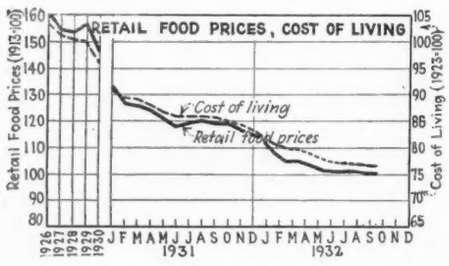
About half of the 24 important commodities shipped abroad in larger quantities during the first months of this year were food products. They included wheat, corn, kafir, milo, rice, apples, oil cake and meal, oilseeds and refined sugar. Outstanding were the extraordinarily large purchases of wheat, the average price of which was the lowest in this century. Exports totaled 37,192,000 bu., or 77 per cent greater than last year.

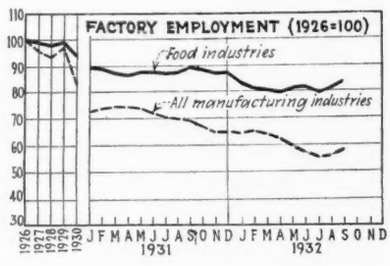
America's leading packing-house export, lard, declined only 8 per cent in quantity shipped abroad, but the price received was the lowest since 1898, being less than 6 cents a pound.

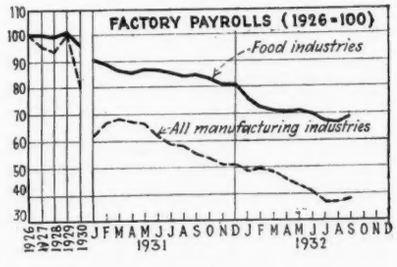
$130,000,000 Food Trade Hit by Tariff Wall

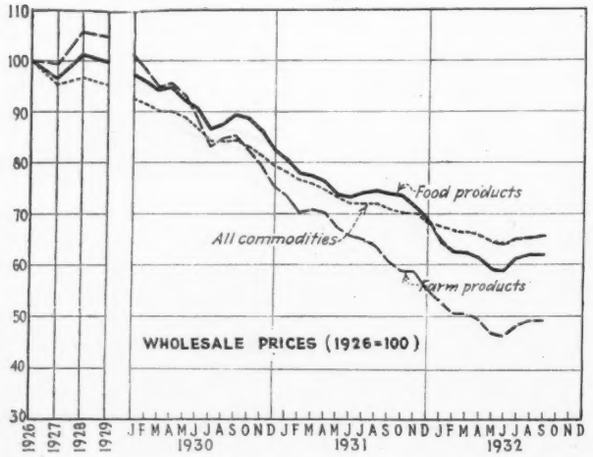
Some idea of the volume of American trade in foods that will be affected by the Ottawa agreements may be gained from the following tabulation of foodstuffs on which the British dominions will enjoy preferential rates, the annual average values of domestic exports for 1926-31 being given:

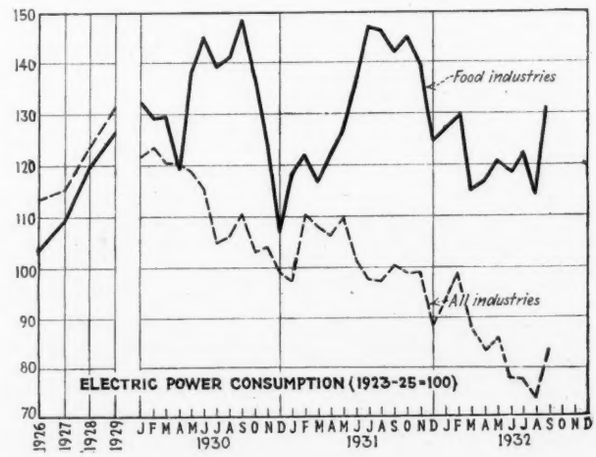
	To All Countries	To United Kingdom	P.C.
Meat products	$49,843,150	$31,362,953	63
Dairy products	15,125,994	2,292,343	15
Eggs in shell	4,951,575	249,693	5
Fish	15,430,084	5,606,507	36
Cereal	216,260,061	43,736,773	20
Honey	685,202	193,862	28
Canned fruit	27,320,285	19,681,889	72
Fresh fruit	54,994,730	21,090,479	40
Dried fruit	32,930,847	6,571,566	20
Total	$417,541,928	$130,786,065	31


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932


FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932


FACTORY PAYROLLS (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932


WHOLESALE PRICES (1926=100)
Food products
All commodities
Farm products
1926 1927 1928 1929
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932


ELECTRIC POWER CONSUMPTION (1923-25=100)
Food industries
All industries
1926 1927 1928 1929
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932

CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded — Awarded October	Cumulative 1932 — No. Awards	Cumulative 1932 — Total
Bakery Products	$40,000	$77,000	27	$2,957,000
Beverage	1,190,000	80,000	9	502,000
Canning and Preserving	143,000	79,000	17	759,000
Confectionery	50,000	.....	1	30,000
Grain Mill Products	56,000	270,000	25	5,155,000
Ice, Manufactured	200,000	.....	37	1,751,000
Meats and Meat Products	68,000	59,000	30	2,043,000
Milk Products	244,000	193,000	42	3,639,000
Sugar	.....	.....	1	40,000
Miscellaneous	1,190,000	118,000	28	2,589,000
Total	$3,251,000	$876,000	217	$19,465,000

PROPOSED WORK BIDS ASKED

Bakery — Dugan Bros., 161 Abington Ave., Newark, N. J., had plans prepared for 1 story bakery here. Estimated cost $40,000. H. Holder, 242 Franklin Ave., Brooklyn, N. Y., is architect.

Bottling Plant—Hoffman Beverage Co., 402 Grove St., Newark, N. J., plans the construction of a bottling plant on South 21st St. Estimated cost $40,000. Epple & Kahrs, 15 Washington St., Newark, are architects. Project will mature in 1933.

Brewery—New Amsterdam Brewing Co., 10 East 40th St., New York, N. Y., plans the construction of a brewery. Estimated cost $1,000,000. C. Dale Badgeley, 101 Park Ave. and 24 West 69th St., New York, is architect.

Brewery and Bottling Plant — Cleveland & Sandusky Brewing Co., H. C. Lang, Pres. and Treas., 2600 Carroll Ave., Cleveland, O., contemplates the construction of additions to its brewery and bottling plant. Estimated cost $150,000.

Candy Factory — E. F. Ruping, Watervliet, N. Y., plans the construction of a candy factory here. Estimated cost $50,000.

Canning Plant—Lytton Co., Kamloops, B. C., plans to construct a canning factory here. Estimated cost $25,000.

Macaroni Factory—A. F. Ghiglione & Sons, Inc., 4715 6th Ave. S., Seattle, Wash., will rebuild macaroni factory recently destroyed by fire. Estimated cost $100,000.

Cheese Factory — Frank Novak, Enterprise, Ore., has leased plant of Cowlitz-Clark Dairymen's Assn., Woodland, Wash., and will equip same for a cheese factory.

Dairy — Martin Dairy Co., Western Ave., Clifton, N. J., is receiving bids for 1 story dairy plant at Butler, N. J. Estimated cost $28,500. James DeRose, 14 Van Cleve Ave., Clifton, is architect.

Dairy Products Plant—Sheffield Farms, 524 West 57th St., New York, N. Y., plans to rebuild plant at Lowville recently destroyed by fire. Estimated cost to exceed $50,000. Maturity indefinite.

Dairy—Tilton Fairfield Dairies, Newton, N. J., had plans prepared by Kuebler & Woolmington, Archts., 1600 Arch St., Philadelphia, Pa., for the construction of a dairy. Estimated cost $40,000.

Milk Plant—Charlottetown Condensed Milk Co., Ltd., Charlottetown, Prince Edward Island, Can., plans the construction of a condensed milk plant. Estimated cost $25,000.

Milk Plant—Western Holstein Farms, Inc., 3402 Avalon Blvd., Los Angeles, Calif., will receive bids about Nov. 10 for 2 story, 80 x 105 ft. milk plant at the southwest corner of 31st St. and Grand Ave., Los Angeles. Estimated cost $75,000. Charles F. Whittlesey, 1616 South Vermont Ave., Los Angeles, is architect.

Evaporating Plant—R. E. DeWolfe, Wolfville, N. S., plans to rebuild apple evaporating plant recently destroyed by fire and is interested in prices of complete equipment. Estimated cost $30,000.

Grain Elevator—A. O. Dailey & Sons, Inc., 24 Glenwood Ave., Binghamton, N. Y., plan the construction of a grain elevator. Estimated cost $28,000. Maturity indefinite.

Milling Plant—C. C. Davis, Paducah, Ky., plans the construction of a milling plant here. Estimated cost $28,000. Maturity indefinite.

Ice Manufacturing Plant—Brown Bros. & Co., Ash St., Willamantic, Conn., having plans prepared for construction of an ice manufacturing plant. Estimated cost $40,000. Private plans.

Ice Plant — Clarksville Ice Co., Clarksville, Ark., plans the construction of a 1 story ice plant. Estimated cost $40,000.

Ice Manufacturing Plant—Albert McClellan, 790 Tolland St., East Hartford, Conn., completed plans for construction of a 1 story, 25 x 25 and 32 x 35 ft. ice manufacturing plant. Estimated cost $40,000. Private plans.

Ice Manufacturing Plant—Southern New England Ice Co., R. G. Hadley, Gen. Mgr., Meriden, Conn., will soon receive bids for construction of an ice manufacturing plant. Estimated cost $40,000. Private plans.

Ice Storage Plant—Seven Mile Beach Ice Co., Otto Wunder, owner, Avalon, N. J., plans to rebuild ice storage plant recently destroyed by fire. Estimated cost $40,000.

Packing Plant—Apache Packing Co., 1200 Tampico St., San Antonio, Tex., is having plans prepared for a 1 story meat packing plant. Estimated cost $40,000.

Packing Plant — Oxnard Citrus Association, Wm. Ross, Mgr., Oxnard, Calif., is building a 110 x 150 ft. addition to its packing plant at Hueneme, Calif. Estimated cost $40,000. Adolph Schroeder, 300 G St., Oxnard, is engineer.

Packing Plant—Morris Packing Co., 143 Walton St., Syracuse, N. Y., plans to alter and repair packing plant. Estimated cost $28,000.

Packing Plant—Wilbert Products Co., 805 East 139th St., New York, N. Y., plans to alter and enlarge 1 story, 100 x 100 ft. food packing and storage plant on Southern Blvd. Charles Schaefer, Jr., 332 East 149th St., New York, is architect.

Packing Plant—Trunz Pork Stores, Inc., Lombard St. and Kingsland Ave., Brooklyn, N. Y., are having plans prepared for altering meat packing plant here. Estimated cost with equipment $28,000. Allmendinger & Schlendorf, 1 Hanson Pl., Brooklyn, are architects.

Vinegar Works—O. J. Gutekunst, Gowanda, N. Y., plans to construct vinegar works here. Estimated cost $40,000.

Warehouse—Best Foods Products Co., 1900 Bryant St., San Francisco, Calif., is having plans prepared by K. Thiell, Archt., 580 Market St., San Francisco, for 3½ story, 82 x 100 ft. warehouse and 1 story, 83 x 100 ft. garage. Estimated cost $85,000.

Warehouse — Empire Produce Co., Elmira, N. Y., plans the construction of a 1 story, 105 x 130 ft. warehouse at State and Clinton Sts. Estimated cost $60,000. H. E. Plumer, 775 Main St., Buffalo, N. Y., is architect.

Produce Plant—Pennington Produce Co., Sulphur Springs, Tex., plans the construction of a produce plant here. Estimated cost to exceed $35,000. Maturity indefinite.

Warehouse—United Grocery Co., 593 South 21st St., Irvington, N. J., is receiving bids for 1 story, 110 x 228 ft. warehouse. Estimated cost $40,000.

Yeast Factory—Standard Brands, Inc., 595 Madison Ave., New York, N. Y., is having plans prepared for a yeast factory at Elmhurst, Calif. Estimated cost $800,000. G. J. Patitz, 595 Madison Ave., New York, is architect.

CONTRACTS AWARDED

Bakery—Santo De Francesco, 11 Wisteria St., Salem, Mass., awarded contract for 2 story, 45 x 55 ft. addition to bakery on Broad St. Extension to Frank Valardi, Saratoga St., East Boston. Estimated cost $30,000.

Bakery—Fischer Baking Co., 242 Livingston St., Newark, N. J., awarded contract for 1 story addition to bakery at 272 Belmont Ave., Newark, to Frank D. Trainer & Son, Inc., 12 Smith St., Irvington. Estimated cost $28,500.

Bakery—McDonald Baking Co., 81-7 Springdale Ave., East Orange, N. J., awarded contract for altering bakery here, including new oven, to Baker Perkins Co., Saginaw, Mich. Estimated cost $17,750.

Bottling Plants—Coca Cola Bottling Plant, Fayetteville, N. C., awarded contract for a 2 story, 60 x 80 ft. plant at Fayetteville to Reincke-Dixon Construction Co., Fayetteville, also plans a plant at Albemarle.

Distillery—Joseph S. Finch & Co., Inc., P. C. Wiehe, Secy.-Treas., 1819 Bway., New York, N. Y., awarded contract for dismantling distillery warehouse at Cheswick, Pa., and re-erecting same at Gilpin Township, Schenley, Pa., to McKibben & Groom, 542 Third Ave., Tarentum, Pa. Extensive improvements will also be made. Estimataed cost $50,000.

Canning Plant—Reed Murdock & Co., East Jordan, Mich., awarded contract for construction of a 2 story, 60 x 225 ft. canning plant to K. Carson, East Jordan. Estimated cost $50,000. Electric motors, etc., will be installed.

Chewing Products Factory—American Chewing Products Corp., E. A. Bonitz, Pres., 142 Mt. Pleasant Ave., Newark, N. J., awarded contract for 1 story addition to factory to Riccardi Bros., Inc., 706 Summer Ave., Newark. Estimated cost $28,500.

Pasteurizing Plant—Borden Farm Products Co., 110 Hudson St., New York, N. Y., awarded contract for alterations to pasteurizing plant including elevator, elevator shafts, etc., at Adelphi and Fulton Sts., Brooklyn, to Burwak Elevator, 390 East 16th St., Brooklyn.

Bottling Plant—Dairymen's League Cooperative Association, 11 West 42nd St., New York, N. Y., awarded contract for altering and constructing addition to bottling plant and milk distribution station at 546 East 19th St., to Frederick Page Contracting Co., 45 East 17th St., New York. Estimated cost $100,000.

Dairy—New Jersey State College of Agriculture, Agricultural Engineering Dept., Nichol Ave., New Brunswick, N. J., awarded contract for dairy plant and barn to Russell Van Liew and George Van Horn, Hopewell, N. J. Estimated cost $28,500.

Milk Distributing Station — Alderney Dairy Co., 607 Main St., Hackensack, N. J., awarded contract for 1 story, 65 x 130 ft. milk distributing station to A. A. La Fountain, Inc., Beech St., Hackensack. Estimated cost $28,500.

Elevator and Hay Storage Building—Atchison, Topeka & Santa Fe Ry., Topeka, Kan., awarded contract for elevator and hay storage building, including concrete head house, at Morris, Kan., to Hettelsater Construction Co., 600 Mutual Bldg., Kansas City, Mo.

Feed Mill—Osen Milling Co., De Pere, Wis., awarded contract for 1 story, 40 x 120 ft. feed mill to The Selmer Co., 305 East Walnut St., Green Bay, Wis.

Grain Elevator—Chicago, Burlington & Quincy R.R. Co., Chicago, Ill., awarded contract for 500,000 bu. capacity grain elevator at Burlington, Iowa, to be leased to Stratton Grain Co., to Burrell Engineering & Construction Co., 1 North Canal St., Chicago. Estimated cost $100,000.

Grain Elevator Addition—Burrus Panhandle Elevators, Amarillo, Tex., will build addition to grain elevator. Estimated cost $40,000. Private plans. Work will be done by owners forces.

Lard Refinery—Rath Packing Co., J. W. Rath, Pres., Waterloo, Iowa, awarded contract for lard refinery for packing plant at Elm and Sycamore Sts., to H. A. Maine & Co., 305 Marsh Place Bldg., Waterloo. Estimated cost $60,000.

Poultry Feed Factory—Atlan Manufacturing Co., 142 Logan Ave., Jersey City, N. J., awarded contract for 2 story factory for the manufacture of poultry feed, to D'Elia Construction Co., 972 Newark Ave., Jersey City. Estimated cost $28,500.

Packing Plant—Ventura Citrus Association, Ventura, Calif., awarded contract for 1 story, 100 x 150 ft. addition to packing plant to W. P. Neil Co., Inc., 4814 Loma Vista St., Vernon, Calif. Estimated cost $28,500.

Meat Packing Plant — M. Reinfeld & Sons, Inc., 100 Prince St., Newark, N. J., is building a 2 story addition to its meat packing plant by day labor. Estimated cost $28,500.

Slaughter House—Colfax Packing Co., c/o A. Worcester, Hotel Biltmore, Providence, R. I., awarded contract for 1 story slaughter house on Colfax St., Pawtucket, R. I., to Innamorati Bros., 137 Clark St., Clinton, Mass. Estimated cost $30,000.

PATENT DIGEST

Baking and Milling

Sausage Rolls Formed From Sheet of Dough in Baking Pans by Removable and Overlying Marking Frames During Proofing and Baking Operations—John U. Lemmon, Jr., Newton, Mass., to Hathaway, Inc., Cambridge, Mass. No. 1,876,701. Sept. 13, 1932.

Doughnuts Sugared by Dipping in Sugar Solution While Yet Hot—Frank Ellis Morris, Philadelphia, Pa., to Doughnut Machine Corp., New York, N. Y. No. 1,880,459. Oct. 4, 1932.

Yeast Propagation in a Wort of High Sugar Content Continued by Adding a Sugar-Containing Wort Consisting in Part of Acid Liquor Derived From Wood—Gustaf Olof Wolfgang Heijkenskjöld to Aktiebolaget Bästa, Stockholm, Sweden. No. 1,881,557. Oct. 11, 1932.

Cake Icing Machine With Means for Regulating Relative Speed Between Icing Feed and Movement of Cakes Through Machines—John R. Litty and True B. Lundin to John R. and Elizabeth H. Litty, Philadelphia, Pa. No. 1,881,747. Oct. 11, 1932.

Dusting Sugar for Doughnuts Treated With Hydrogenated Coconut Oil to Make It Non-absorbent of Moisture and Oil From the Doughnuts—Harry M. Blinn, Baltimore, Md., to Doughnut Machine Corp., New York, N. Y. No. 1,882,476. Oct. 11, 1932.

Confectionery

Confection Made by Coating Nuts, Fruits and Cereals With Honey, Then With Finely Divided Milk Sugar, and Finally With an Outside Coating of Honey—Paul H. Bolton and Eric N. Bolton, Youngstown, Ohio. No. 1,877,641. Sept. 13, 1932.

Chewing Gum Made From African Gum Resin—Van Lear Woodward, Stone Ridge, N. Y. No. 1,881,989. Oct. 11, 1932.

Cocoa Butter Extracted From Aqueous Mixture of Cocoa-Bean Products by Gravity Separation—Ivan S. Hocker to the Hocker Corp., Philadelphia, Pa. No. 1,882,013. Oct. 11, 1932.

Milk Chocolate Produced by Triturating Finely Divided Cocoa Solids and Powdered Milk Solids Containing Sufficient Quantity of Fat to Permit Coalescence—Herbert E. Otting, Westerville, Ohio, to M. R. Dietetic Laboratories, Inc., Columbus, Ohio. No. 1,882,028. Oct. 11, 1932.

Frozen Confections of Sucker Type Formed and Dispensed in Closed, Individual, Sanitary Container—Matthew E. Meagher, Bethlehem, Pa. No. 1,882,290. Oct. 11, 1932.

Dairy and Egg Products

Finely Divided Milk Sugar Added to Partially Frozen Ice Cream to Give a Product of Smooth Consistency, Although Containing More Than 6¼ Per Cent Lactose—Chester Earl Gray, one-half to Grover D. Turnbow, Oakland, Calif. No. 1,878,127. Sept. 20, 1932.

Pure Casein Produced by Spraying Suspension of Finely Divided Curd in Water Into a Heated Atmosphere—Champlain L. Riley, North Plainfield, N. J., to Industrial Associates, Inc., New York, N. Y. No. 1,878,182. Sept. 20, 1932.

An Inexpensive, Low Production Device for Separating Yolks and Whites of Eggs—Richard W. Regensburger to Industrial Patents Corp., Chicago, Ill. No. 1,878,294. Sept. 20, 1932.

Processed Soft Cream Cheese With High Butter Fat and Low Milk Sugar Content—Felix M. Fredericksen to Pabst Corp., Milwaukee, Wis. No. 1,879,162. Sept. 27, 1932.

Fruits and Vegetables

Apples Prepared for Freezing by Treatment in Brine Solution Under Vacuum Previous to Sugaring Under Atmospheric Air Pressure—Rudolph A. Rasche, Cincinnati, Ohio. No. 1,877,587. Sept. 13, 1932.

Grading Table for Use in Connection With Production of Citrus Fruit Juices—William D. Bost to Orange Crush Co., Chicago, Ill. No. 1,878,099. Sept. 20, 1932.

Concentrated Syrup With Pectin in Suspension Which Upon Dilution and Sweetening Produces a Jelly—Hugo D. Loesch, Rochester, N. Y., to General Foods Corp., New York, N. Y. No. 1,879,697. Sept. 27, 1932.

Grape Juice Preparation Made From Normal Grape Juice, Cane Sugar, Gelatin, Orange and Lemon Juices, and Vanilla Extract—Leonidas Alexandrou, New York, N. Y. No. 1,881,158. Oct. 4, 1932.

Meat Packing

Sausages Oscillated During Smoking to Get Uniform Treatment—Heinz Becker, Hamburg, Germany. No. 1,879,032. Sept. 27, 1932.

Meat Cooked, Sterilized and Flavored While Sealed Within Can—Michael Cudahy, Milwaukee, Wis., to Cudahy Bros. Co., Cudahy, Wis. No. 1,880,837. Oct. 4, 1932.

Fish and Other Meat Forced Into Cake Form by Mechanical Means—Edward H. Cooley, Belmont, Mass. No. 1,881,171. Oct. 4, 1932.

Miscellaneous Products and Processes

Method of Manufacturing Dextrose From Starch—Charles Ebert, Leonia, N. J., William B. Newkirk, Riverside, Ill., and Meyer Moskowitz, Spring Valley, N. Y., to International Patent Development Co., Wilmington, Del. No. 1,876,883. Sept. 13, 1932.

Chicle Recovered From Filter Press Residue by Use of Hot, Fluid Waxlike Material—Marcus A. Gordon, Little Neck, N. Y., to American Chicle Co., Long Island City, N. Y. No. 1,877,299. Sept. 13, 1932.

Sucrose Content of Defecated Molasses Precipitated as Barium Saccharate by Use of Barium Hydroxide Dissolved in Molasses Mother Liquor—Alfred L. Holven, Crockett, Calif. No. 1,878,145. Sept. 20, 1932.

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Cereal Subjected to High Pressure and Then Converted to Puffed State Under Automatically Controlled Conditions—Oscar C. Kirn to the Quaker Oats Co., Chicago, Ill. No. 1,878,782. Sept. 20, 1932.

Vitamin Concentrates Obtained by Saponifying Fats in Acetone With Non-Alcoholic Alkali-Metal Hydroxide—Walter G. Christiansen, Bloomfield, N. J., and Eugene Moness, New York, N. Y., to E. R. Squibb & Sons, New York, N. Y. No. 1,879,734. Sept. 27, 1932.

Vinegar Manufactured by Recirculation Process Under Temperature and Rate of Circulation Control—Heinrich Frings, Bonn-on-the-Rhine, Germany. No. 1,880,381. Oct. 4, 1932.

Oil-Bearing Food Commodities Protected Against Rancidity by Wrappings Which Admit Only Wave Lengths of Light Lying Between 4900-5600A.—Mayne R. Coe, Washington, D. C., to free use of the Government and the Public. No. 1,880,813. Oct. 4, 1932.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

THE GOVERNMENT PUBLISHES

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated, pamphlet is free and should be ordered from bureau responsible for its issue.*

Variety Tests of Sugarcanes in Louisiana During the Crop Year 1930-1931, by George Arceneaux, I. E. Stokes and R. B. Bisland. Department of Agriculture Circular No. 242; 5 cents.

A Milk-Quality Improvement Program for Extension Workers, by C. J. Babcock and J. B. Parker. Department of Agriculture Miscellaneous Publication No. 148; 5 cents.

The Pritchard Tomato, by William S. Porte. Department of Agriculture Circular No. 243.

Fruit and Vegetable Shipments. Department of Agriculture Statistical Bulletin No. 38; 15 cents. Gives full statistics for calendar years 1929 and 1930 on carload shipments and unloads of important fruits and vegetables.

Fisheries of the Virgin Islands, by R. H. Fiedler and N. D. Jarvis. Bureau of Fisheries Investigational Report No. 14; 5 cents.

The Fisheries of Porto Rico, by Norman D. Jarvis. Bureau of Fisheries Investigational Report No. 13; 5 cents.

Introduction of Japanese Oysters Into the United States, by Paul S. Galtsoff. Bureau of Fisheries Fishery Circular No. 12; 5 cents.

Work of the Tariff Commission. U. S. Tariff Commission Miscellaneous Series pamphlet. A résumé of the work of the commission since reorganization in 1930.

Food Specifications. Separate pamphlets at 5 cents each as issued by the Federal Specifications Board on ginger ale, fresh oysters, tomato puree.

Bases of Value for Assessment of Ad Valorem Duties in Foreign Countries. U. S. Tariff Commission Miscellaneous Series pamphlet; 5 cents. Describes legal bases for computing duties of important countries.

Taxes on Brewer's Wort and Malt Products, Grape Products, Soft Drinks. Bureau of Internal Revenue, Treasury Department Regulations 44. Gives instructions regarding the application of the Revenue Act of 1932.

State Requirements for Industrial Lighting, by Marie Correll. Department of Labor Bulletin of the Women's Bureau No. 94; 10 cents. A handbook showing lighting standards and practices, particularly with reference to safety of women workers.

Preparing Shipments to Canada, by Mary H. Fricker and Henry Chalmers. Bureau of Foreign and Domestic Commerce Trade Promotion Series No. 91 (revised). A summary of the documentation and customs entry requirements for freight, express and other commodity shipments.

Food Chains. Census Bureau unnumbered pamphlet from the Retail Distribution Merchandising Series. Gives statistics on grocery store, meat market, combination store, and other food shop chain establishments.

Chain Stores. Senate Document No. 100. One of the series of reports by the Federal Trade Commission to the Senate on various phases of the chain store investigations. Approximately ten pamphlets of this series have been issued.

Prices and Competition Among Peanut Mills. U. S. Senate Document No. 132. A summary report from the Federal Trade Commission to the Senate in response to its orders for investigation of this industry.

Production Statistics From 1931 Census of Manufactures. Preliminary mimeographed reports on: glue and gelatin; flavoring extracts and flavoring syrups; peanuts, walnuts and other nuts processed or shelled; cereal preparations.